

FLIGHT

THE
AIRCRAFT
ENGINEER.

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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EDITORIAL COMMENT





CONGRATULATIONS to Sir John Alcock and his gallant companion in the Atlantic flight, Sir A. Whitten Brown, on the well-deserved honour conferred upon them by His Majesty the King. It was a knightly deed they compassed and knightly has been their reward. Apparently the inspiration of the honour was the King himself, and therein he has followed in the steps of his great

Honouring the Brave predecessor on the throne of England, Queen Elizabeth, who delighted thus to honour those of her subjects who accomplished great things to the glory of the country. It was thus she honoured Drake at the end of his voyage round the world, and though his adventure occupied three years as against the 6 hours of the first direct Atlantic crossing in the air, the two are not so absolutely dissimilar as to preclude mention together. Drake went off in the any, crazy ship of the time to explore the unknown waters of the world, and achieved the surpassing feat of being the first Englishman to circumnavigate the

globe. Alcock and Brown equally went off into the unexplored air, fired with the intent to bring home to Britain the honour of the first direct flight across the trackless Atlantic. They also succeeded, and for as long as history exists theirs will be the names associated with this great achievement, and to Britain will belong the honour of it. It is fitting, therefore, that His Majesty should have chosen the manner he has of conferring upon the two aeronautical pioneers the mark of his recognition of the signal service they have rendered to the country and its history.

The Air Ministry and the Aerial Derby For some reason best known to itself, the Air Ministry seems to have intervened to forbid the flying of certain machines in last Saturday's Aerial Derby. The prohibition extended to machines which were built for or to the designs of the Ministry, and included some nine or ten different types of the most up-to-date variety. So far, no official explanation of why the ban was imposed has been vouchsafed, nor do we anticipate that the Ministry will deign to explain its extraordinary action. We have some reason to believe, however, that the officials responsible for the decision held, quite wrongly as we think, that as the machines in question had been designed by or for the Ministry and that the latter had assisted the constructors with public funds, it was not fair to other competitors who lacked that assistance to allow the machines in question to compete. As we say, that reason has not been given officially, but "from information received" we gather that this was the view that led up to the action noted. If it really is the reason, then we may say at once that it seems to us to be a very lame one indeed. According to its constitution, the Air Ministry exists in part for the encouragement of civilian aviation. The banned machines were certainly not needed for military purposes at the moment, and it would have been thought that, even if no other reasons existed, the Aerial Derby would have been an excellent opportunity for trying out the new designs. Even if one or two of them had been crashed in the race, we are not at war, and it would have been perfectly easy to have replaced them within a very short space of time.

As to the alleged solicitude of the Air Ministry for competitors who had not the advantage of flying machines of the newest design and fitted with the

last word in engines, we decline to take it seriously. It seems to us to be a sort of after-thought of a department which realises it has made a mistake and seeks an easy way out. We certainly think a mistake was made, and that the Ministry should never have imposed its ban in the way it did. After all, it exists for the encouragement of aviation, and its business is, therefore, to give all facilities possible for the demonstration of new types and new engines, and by no means to stand in the way as it has done in the present instance. It is not even as though the Ministry had forbidden its own officers to take part on machines directly belonging to the Service. That would have been understandable, and indeed quite right, but to prohibit the entry of machines which have not even been delivered or passed their final acceptance tests, is not in the least understandable, and leaves us wondering if the Air Ministry is really a Ministry of Encouragement, or if it is going to exercise the same blighting influence over aviation that other Government Departments do over matters with which they have to deal. After all the protests and announcements which have emanated from the Hotel Cecil in connection with the future development of aviation, the action taken is incomprehensible.

• • •
"Flights
that
Made
History"

The successful crossing of the Atlantic, which is certainly one of the "Flights That Made History," naturally compels the student of aeronautic history to go back to examine the milestones of flight and to dissect from the contemporary records those occurrences in aviation which, more than others, mark the stages of development. And the study of these records must demonstrate to him how astonishing has been the rate of progress in that development. We are accustomed to hear it said, more or less casually, that flight has made enormous strides during the past 10 years or so, but very few realise adequately how great has been the march of progress or how rapid. For example, is it believable that it is not 16 years since the first controlled flight was made in a power-driven aeroplane? Yet it is so. On December 17, 1903, Orville Wright made that essay in the air which is now the first real landmark in the history of the aeroplane. His flight lasted 59 seconds, and the distance flown was no more than 260 metres! In 1908, only 11 years ago, Henry Farman flew 1,093 yards, at a speed of 34 miles an hour, winning the Deutsch-Archdeacon prize of £2,000 and the *Daily Mail* £100 for a half-mile circular flight. Again, it was on July 25, 1909, less than 10 years ago, that Blériot flew the Channel, and two months later that Moore-Brabazon won the *Daily Mail* £1,000 prize for the first circular mile flight on a British machine.

The two years, 1910-11, saw a considerable development. It was in the former year—in April, to be exact—that Paulhan won the *Mail's* £10,000 prize for the London-Manchester flight of 183 miles, which occupied 4 hours 12 minutes. Fifteen months later came the Circuit of Britain, with another £10,000 prize, which was won by Lieut. Conneau of the French Army. Still, development was not particularly rapid, especially as demonstrated by really long-distance flights. In August of 1912 Audemars flew from Paris to Berlin, but it was not until July, 1913, barely 12 months before the outbreak of war, that Slack made the first non-stop flight from Paris

to London—a journey which is now so usual and withal so commonplace that it excites no comment at all. Compared with the long-distance flights of to-day these are the merest "joy-flips," yet in their time they made history. And when we come to peer into the future, would he not be a bold man who would affirm that in 10 years' time we shall not have made progress as great in comparison as the past decade has seen achieved? We ourselves would certainly not care to say that the sum of progress will not be equally great.

There are many who think that the War taught us nearly all there is to learn about the design of machines and engines, and that progress must necessarily slow down now that the incentive of war to improve is no longer with us. There is something in the latter part of the argument, perhaps, but we would nevertheless point out that Paulhan's flight from London to Manchester fixes a very wide gulf between it and Farman's half-mile flight for the Deutsch-Archdeacon prize. Yet there were only two years between them. It is only six years since Slack's Paris-London flight, and five of the intervening years have been spent in war when no record figures were obtainable. And now we have a dozen or so recorded flights of nearly a thousand miles without a stop. Further, there are the records of Roget, with 1,375 non-stop miles to his credit, and of Alcock and Brown with nearly 1,800 miles. At the moment, the only limiting factors seem to be the capacity of the machine for the carrying of fuel supplies and the physical endurance of the pilots and crew. As to these, improvements in the machine itself will modify the first. The second is simply a matter of the provision of reliefs, so we see no reason why the existing records should stand for long. Milestones of aviation they will remain as long as history endures, but other milestones will be set up along the highway, and in the years to come we shall look back to those that now mark the tale of progress, and wonder why we regarded them, even for a moment, as ultimate.

• • •
The
Aerial
Derby

The Circuit of London race held last Saturday was undoubtedly one of those events which possess a very high propaganda value. How many people actually saw the race we do not know, but it is safe to count them in millions. Every one of those people, unconsciously perhaps, received an object-lesson in the progress of aviation, and has been rendered more familiar with the potentialities of usefulness possessed by the aeroplane. It is true enough that the sight of an aeroplane in flight has become so commonplace as to excite no remark, and it might therefore be thought that such a race as that we are discussing would be merely an incident in the eyes of the general public. That is not so, however, since it tends to lift the commonplace to a higher plane of interest than it would otherwise possess. All round London there were assembled great crowds waiting for the advent of the racers, every constituent of which was anxious to pick out and identify the individual competitors and to speculate on their chances of success. If any there be who doubt the public interest in the race were fortunate to witness the rush for the evening papers to see the result, their doubts must have been speedily set at rest. As we have said many times in the columns of *FLIGHT*, what the movement requires more than



Mr. H. T. VANE, C.B.E., Managing Director and General Manager of Messrs. D. Napier and Son, Ltd.

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anything at the moment is good propaganda, in order that the public may be familiarised with aviation and learn to put its trust in aircraft as a medium of transport. Nothing can serve this end better than such races as that of Saturday last.

Another purpose that is well served by such events is the cause of development. It is obvious that everyone concerned must learn some useful lesson from the experiences met with in their course. If we were asked to state what we consider the outstanding lesson of last Saturday's race, we should say at once that it is to be found in the marvellous improvement that has taken place in the design of the machine itself, apart from the aero engine. That, we think, was well exemplified in the really wonderful performance of the little Avro, which in a whole gale of wind completed the double circuit of the course at an average speed of somewhere near 70 miles an hour. When we consider that this machine was equipped with an engine of but 35 h.p.—it is, we understand, the identical 10-year-old motor which was fitted in Pixton's pre-War machine on which he used to fly at Brooklands—it is perfectly clear that the performance was due entirely to the more efficient design of the machine compared with 1914. Naturally, everyone knows that design has been improved almost out of knowledge during the War, but it required such an object-lesson as this to tell us how great that improvement has really been.

The Great Linen Deal A great deal of criticism has been levelled at the Government for its action in the matter of the sale of aeroplane linen, at a round price of £4,000,000, to a single individual. The principal

point made by the critics seems to be that the public had been given quite inadequate facilities for purchasing this linen, and that had the authorities taken a little more time and trouble in the matter a far larger sum might have been realised. To some extent we agree with the criticism. The Government some little time ago announced that this linen could be purchased by the public in lots of, we believe, 80 yards, and we are given to understand that a good many people actually tried to purchase such lots, but, generally, without success. There is this to be said, that the Disposal Board can hardly be expected to go into a small retail business, and a part of the trouble seems to have been that people ignored the statement that the minimum quantity to be sold was as stated, and applied for all sorts of absurd quantities. Manifestly, the Board could not deal in "dress-lengths," and it is quite possible that it has taken the best course, from the point of view of the taxpayer, in disposing of the whole lot at a single deal.

Whether there should have been some stipulation as to its sale to the public at a maximum price included in the terms of the sale, may be an open question, though, if the latest news is to be trusted, it would seem that the public may even now for once "get its own back."

The Irish linen manufacturers seem to be annoyed at the deal, and apparently are determined to undersell the purchaser of this Government fabric and drive him out of the market, even if they have to give away their product, although it must be confessed the world is a fairly big tract to get up against. Still, it is an ill wind that blows no one any good.



Capt. Alcock and Lieut. Brown Knighted

Capt. JOHN ALCOCK and Lieut. Arthur Whitten Brown had the honour of being received by the King at Windsor Castle on June 21, when His Majesty conferred upon them the honour of knighthood and invested them with the Insignia of Knights Commanders of the Most Excellent Order of the British Empire (Civil Division).

Both officers had a most enthusiastic reception at Windsor and were escorted by a crowd of Eton boys from the station to the Castle. On arrival Capt. Alcock and Lieut. Brown were presented to the Prince of Wales who congratulated them on their flight. They were then presented to the King, and His Majesty accorded them the accolade with the usual ceremony.

The King then talked with the new knights about their experiences; he expressed his pleasure that British officers were the first to cross the Atlantic in direct flight, and said it was his own suggestion that the Order should be conferred upon them.

The Queen subsequently congratulated them, and Sir John Alcock and Sir A. Whitten Brown signed their names in the autograph books of the King, the Queen and Princess Mary. After luncheon with members of the Royal Household, they returned to the station and were again given a rousing reception by Eton boys.

An Air Force Investiture

THE Air Ministry makes the following announcement:—

The King will confer the Insignia of the Distinguished Flying Cross and the Air Force Cross on a limited number of officers to whom they have been awarded, at Investitures to be held at Buckingham Palace on Saturday the 19th and Thursday the 24th July next.

Officers who desire to receive their decorations on those dates should apply immediately to the Secretary, Air Ministry, Hotel Cecil, Strand, W.C. 2, specifying their full Christian names and surnames, and whether to receive the Distinguished Flying Cross or the Air Force Cross. Arrangements will then be made for attendance at the above Investitures as far as possible, and those officers only who receive a summons for a specific date should attend.



Officers who have already applied some time ago should repeat their applications now.

Officers who may require tickets for their friends to witness their investitures should apply to the Central Chancery of the Orders of Knighthood, St. James's Palace, S.W. 1, after they have received notices from that department to attend.

R.A.F. and the Territorials.

OPENING at 25, Camden Road, St. Pancras, on June 21, the first aircraft instruction wing in connection with the Territorial Air Force movement, Gen. Sir H. M. Trenchard, Chief of the Air Staff, said the formation of wings such as that was important, and those working with him at the Air Ministry were devoting great attention to the development of aircraft in the Territorial Force. In addition to the technical training, sports and games would be encouraged. He could safely say that the sport-loving Englishman had proved the finest pilot in the world. He was so satisfied with the organisation of the scheme from what he had seen that greater assistance would be given them from the Air Ministry.

The Air Mail to Cologne

THE daily aerial service between Hawkinge (Folkestone) and Cologne continues to give good results. Since the service was instituted on March 1 with four aeroplanes, carrying between them 25 bags of mails, the mail has steadily increased, reaching the total of 2,276 outward and 886 inward bags for the three months ending May 31. Speeding up the handling of the mail at this end has resulted in correspondence leaving Cologne one morning being delivered to all parts of England and Wales from Folkestone by the first delivery on the following morning.

On May 15 a mist hung over the Channel and on the return journey a pilot was flying so low that on several occasions his wheels touched the water. Another pilot on the same day was compelled to come down in the sea, but was saved, and delivered his mails at Boulogne intact. The aerodrome at Hawkinge is in direct wireless communication with Cologne. The machines used are Airco 9's with B.H.P. motors and Airco 9A's with Liberty motors.

THE AVRO "BABY" SPORTING BIPLANE

35-40 h.p. Green Engine

In the Avro "Milestones" series, published in our issue of March 20, was included a little single-seater machine designed for sporting purposes. In the article mentioned this machine was referred to as the "Popular." The name has since been altered to Avro "Baby." As the former title suggests, the machine has been designed with a view to producing a machine which can be sold at a reasonable price, to be used for sporting purposes, and, one would suggest, which would form a very useful school machine to form a step between the dual control type and the high-speed, high-power model that most pupils will probably be called upon to fly after leaving the flying school. For a solo machine for this class of work the Avro Baby would appear to be particularly well fitted, since it is fairly sensitive on the controls, yet possesses a great amount of natural stability which could not but inspire a beginner in solo flights with confidence. As the Baby, in spite of its relatively small power, has a very good performance

accordance with modern ideas, as indicated by the single pair of struts on each side, by the outward rake of its centre section struts, and by the low placing of the top plane in relation to the pilot.

Constructionally the machine follows standard Avro practice. The *fuselage*, which is of rectangular section, with an arched deck fairing, is of the conventional girder type. The *longerons* and struts are of spruce, and the bracing is in the form of steel wire. The well-known Avro body sockets and turnbuckles are used, as shown in one of the accompanying sketches. For such a small machine, the pilot's cockpit is surprisingly roomy and comfortable. The seat is of the aluminium bucket type, with an upholstered cushion. A padded head rest is provided, and the deck fairing behind the pilot contains a small locker for carrying small articles such as spares, etc. A three-ply floor covered with aluminium sheet forms the heel rest for the pilot's feet, and the foot-bar is so arranged that the pilot



THE AVRO BABY, 35-40 H.P. GREEN ENGINE.—Front view.

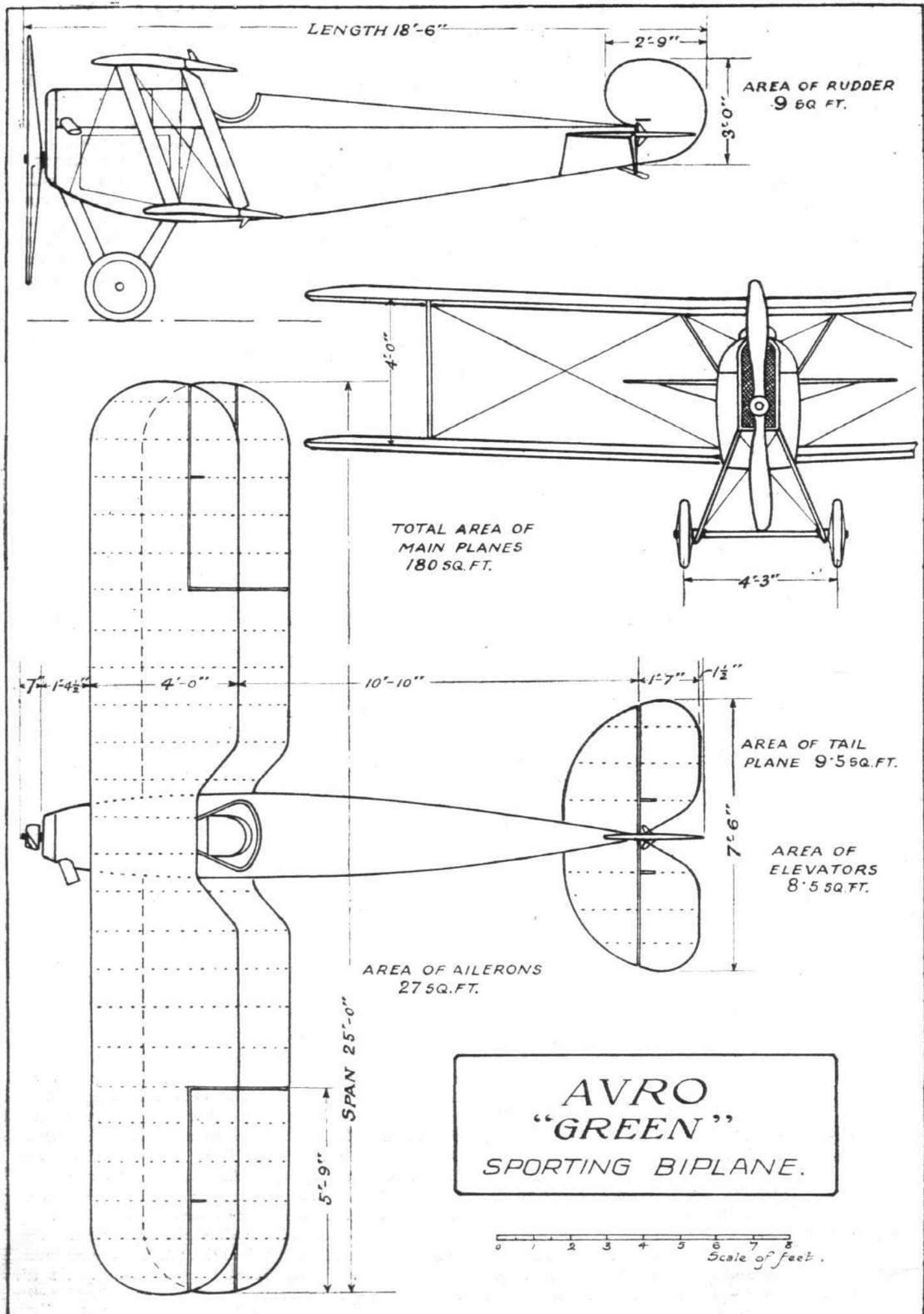
it should also become popular with pilots wishing to keep a little runabout for their own personal use, a machine which, while being inexpensive both in first cost and upkeep, is sufficiently in keeping with the modern idea of an aeroplane to provide one with quite good sport.

As the accompanying photographs and scale drawings will show, the Avro Baby has a very strong resemblance to the other members of the Avro family. This applies not only to the outward appearance of the machine, but also to a great extent to the internal construction. As regards the former, the main distinguishing features of the Avro two-seaters are: planes of high aspect ratio, pronounced stagger, a *fuselage* fairly long in proportion to the span, and semi-circular rudder with semi-circular balance. All these features are retained in the Baby, although others, such as rectangular planes and tail planes with corners rounded off, have been modified, as will be seen from the plan view.

While thus retaining the typical features of its predecessors, the Avro Baby has been designed in

can; by slightly shifting his feet, use either the toes or the instep for steering. The deck fairing in front of the pilot is so arranged that, while giving a good view, it deflects the air from the pilot's face, and it is not necessary to wear goggles when flying this machine. For those who object to feeling any draught at all on their face, a folding wind-screen is provided, but we imagine that most pilots will prefer a slight draught, as this generally helps a pilot to "feel" the speed, etc. For the man who likes to look after his own machine accessibility is of great importance, and this has been well looked after in the Avro Baby by arranging the body covering in such a manner that it may be quickly stripped off so as to afford examination of the body structure.

The controls are of the standard type, with a foot bar for the rudder control, and a universally mounted steel tube actuating elevator and *ailerons*. As the control "stick" is mounted at its base, the elevator control cables pass round pulleys mounted on the foot-bar support, and thence to the elevator. The *aileron* cables pass over universally-jointed pulleys



THE AVRO BABY.—Plan, front and side elevations to scale.



THE AVRO BABY, 35-40 H.P. GREEN ENGINE.—Three-quarter front view.

to the crank levers. All the control cables are of standard type, passing through fair leads, and the splices are of the standard Air Board type.

A large instrument-board is conveniently placed, and carries a very complete set of instruments, including: revolution counter, altimeter, air-speed indicator, radiator thermometer, oil-pressure gauge, cross level, watch and engine switch.

The power plant is a four-cylinder vertical 35-40 h.p. Green water-cooled engine. The two engine-bearers (of wood) are mounted on transverse supports bolted to the stout struts in the nose of the body. The radiator, which is of the honeycomb type, was built by the Excelsior Radiator Co., of Leeds. It is mounted in the nose of the fuselage, motor car fashion. With regard to the engine fitted in this particular machine, it is of interest to know that this is the identical engine fitted on the Avro biplane on which Capt. Pixton did so much flying in 1912. It is only fair to mention, however, that the engine has been overhauled and improved by Messrs. Green, and has been fitted with aluminium pistons, new type cam shaft, valves and valve cages, and also with an ingenious oil-pressure regulator

which regulates the amount of oil used by the engine according to the throttle opening. The petrol tank contains eight gallons of petrol, or sufficient for a flight of over 200 miles, flying at cruising speed. For a sporting machine this range should be ample. The weight and complication of pressure feed has been dispensed with, the fuel flowing to the carburettor by the force of gravity. The oil tank has a capacity of $1\frac{1}{2}$ gallons, and as the engine is of the dry-sump type, the oil is kept in constant circulation through the engine by means of a gear pump.

From the illustrations it will be seen that the engine is neatly cowled in by aluminium cowling, large inspection doors giving access to every part of the engine, piping and tanks. If necessary, the whole engine cowl can be easily removed. A large exhaust collector on the port side carries the exhaust gases away from the fuselage. With regard to the engine controls, wires have been entirely eliminated, the controls being all of the positive pull-and-push rod type.

The undercarriage is of the simple Vee type, with struts of circular section steel tube, streamlined with light three-ply fairings, which are in turn covered



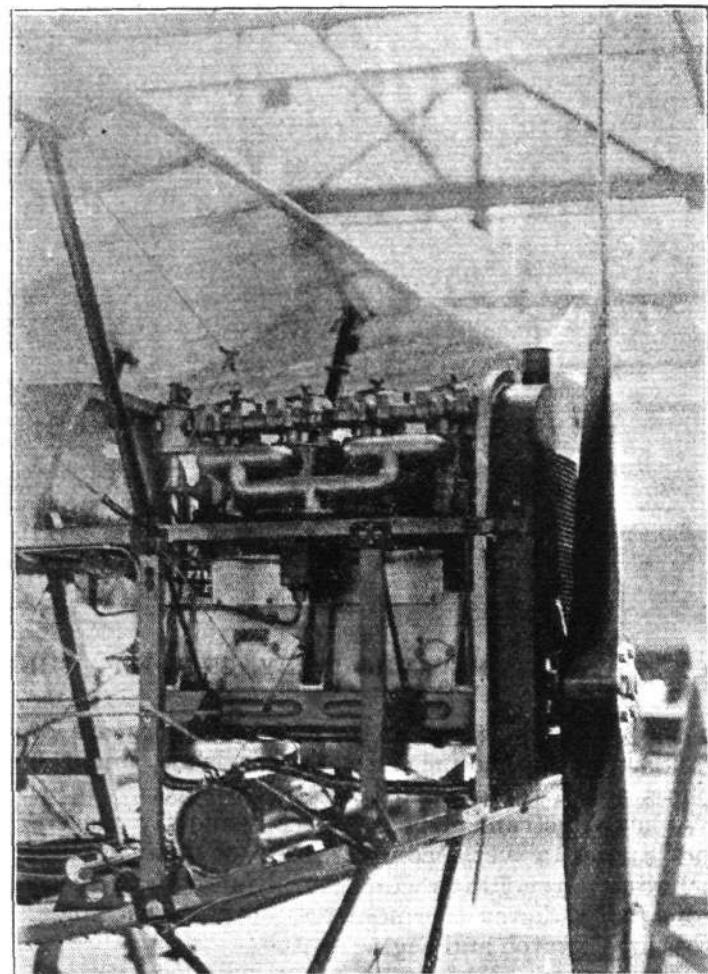
THE AVRO BABY, 35-40 H.P. GREEN ENGINE.—Three-quarter rear view.

with linen, doped and painted. The axle is of the divided type, hinged in the centre, and springing is by means of rubber shock absorbers. The tail skid is of simple construction, as shown in the photograph. It is made of ash and has a steel wearing shoe. It is sprung by rubber cord.

In general arrangement the main planes follow modern practice. The roots of the lower planes are attached to the sides of the *fuselage*, while the two halves of the top plane are bolted to a centre section carried on four raked struts from the body. As already mentioned, there is only one pair of inter-plane struts on each side. These struts are of wood, while the four centre section struts are streamline steel tubes. The arrangement of the wing bracing is somewhat unusual. The landing wires do not present any departures from usual practice, being in the plane of the struts. The lift wires, however, are arranged somewhat differently. Although not being in duplicate in the usual sense of the word, the lift wires are four in number on each side. Perhaps their arrangement may be best described by saying that the four lift wires form a letter M, the two top points being secured to the top of the inter-plane struts, while the three lower points are anchored to points on the *fuselage*. In this manner not only is the lift distributed over a considerable length of the body, but by the angularity of the wires the internal drag bracing is relieved of some of its load.

Constructionally the planes are built-up in the usual Avro manner. The main wing spars are of built-up box section, while the leading edge is of wood spindled out to a U section. The wing tips and the trailing edges are in the form of steel tubes. The wing ribs are of the wood girder type, with box girder ribs taking the compression load imposed by the internal drag bracing. *Ailerons* are fitted to both top and bottom planes, the upper and lower flaps being connected by wires.

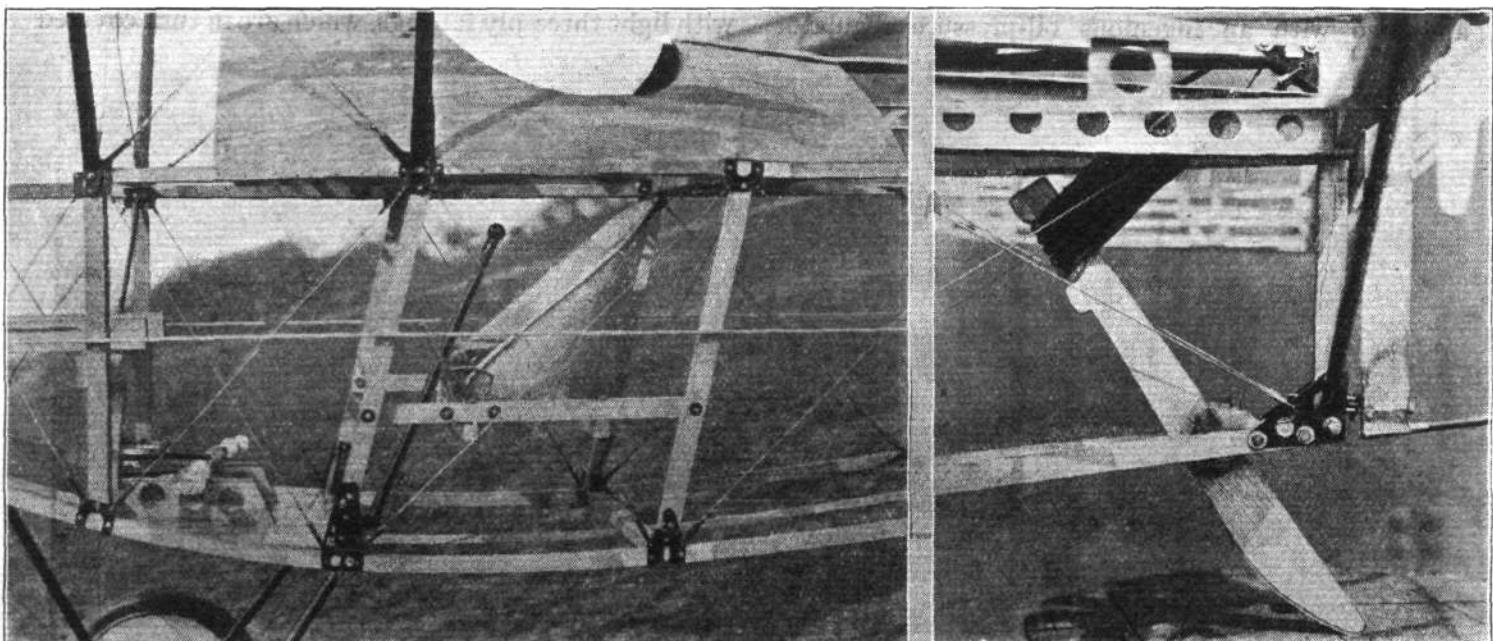
From the scale drawings of the machine it will be seen that the tail planes and elevators are of very graceful outline, while the rudder is of the usual Avro shape; this shape of rudder, by the way, has formed one of the distinctive features of the Avro machines for a number of years. No fixed vertical



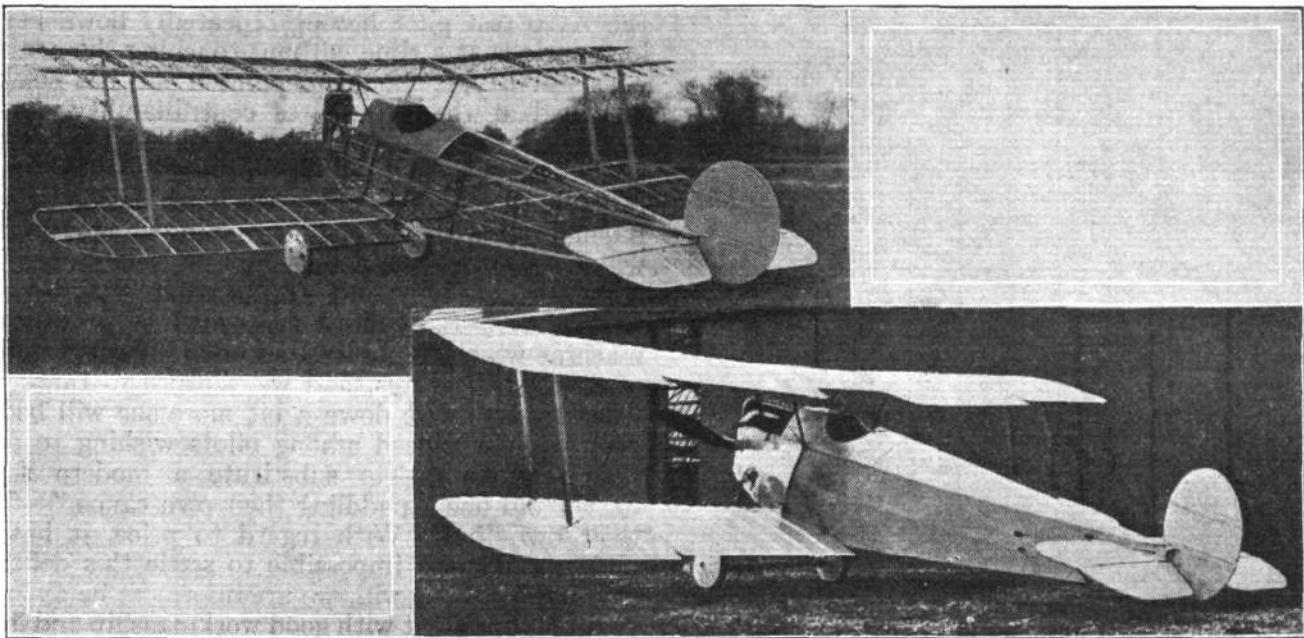
THE AVRO BABY.—View of the mounting of the 35-40 h.p. Green engine.

fin has been fitted, as this has been found unnecessary in such a small machine.

With regard to the performance of the Avro Baby, this can only be described as uncommonly good for a machine of so low power. As the accompanying climb chart will show, the climb curve is practically a straight line, the rate of climb being very good for the power. As regards horizontal speed, this is about 78 m.p.h. near the ground, or in other words



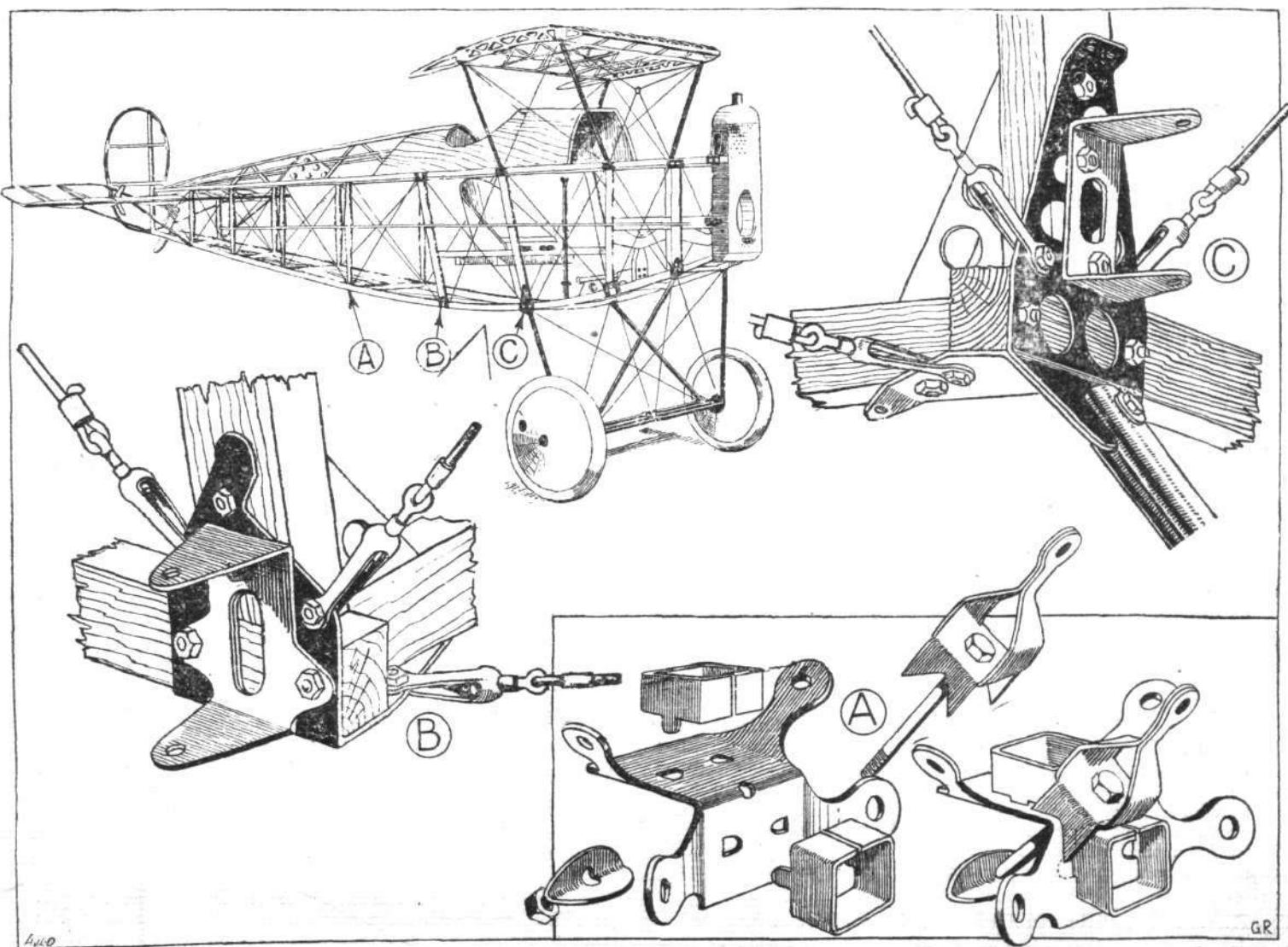
THE AVRO BABY.—On left, view of the *fuselage*, showing pilot's seat and controls; and on the right, the tail skid.



THE AVRO BABY.—Two views of the machine, before and after covering

quite fast enough for a machine to be used for pleasure flying. The landing-speed is only 32 m.p.h., low enough for a beginner to make a safe landing every time, with reasonable care, and so low as to enable

pilots who have been used to the high landing-speeds of modern fighting machines to bring the machine into a very confined space indeed. As the Baby leaves the ground after a very short run, she will



THE AVRO BABY.—Some constructional details and a key sketch indicating the location of the details. In the key sketch the struts of the undercarriage are shown without the streamline fairing. The detail sketches, B and C, show attachment of rear and front spars to fuselage, while A is a sketch of the neat standard Avro fuselage socket and wiring lugs

The Aerial Derby

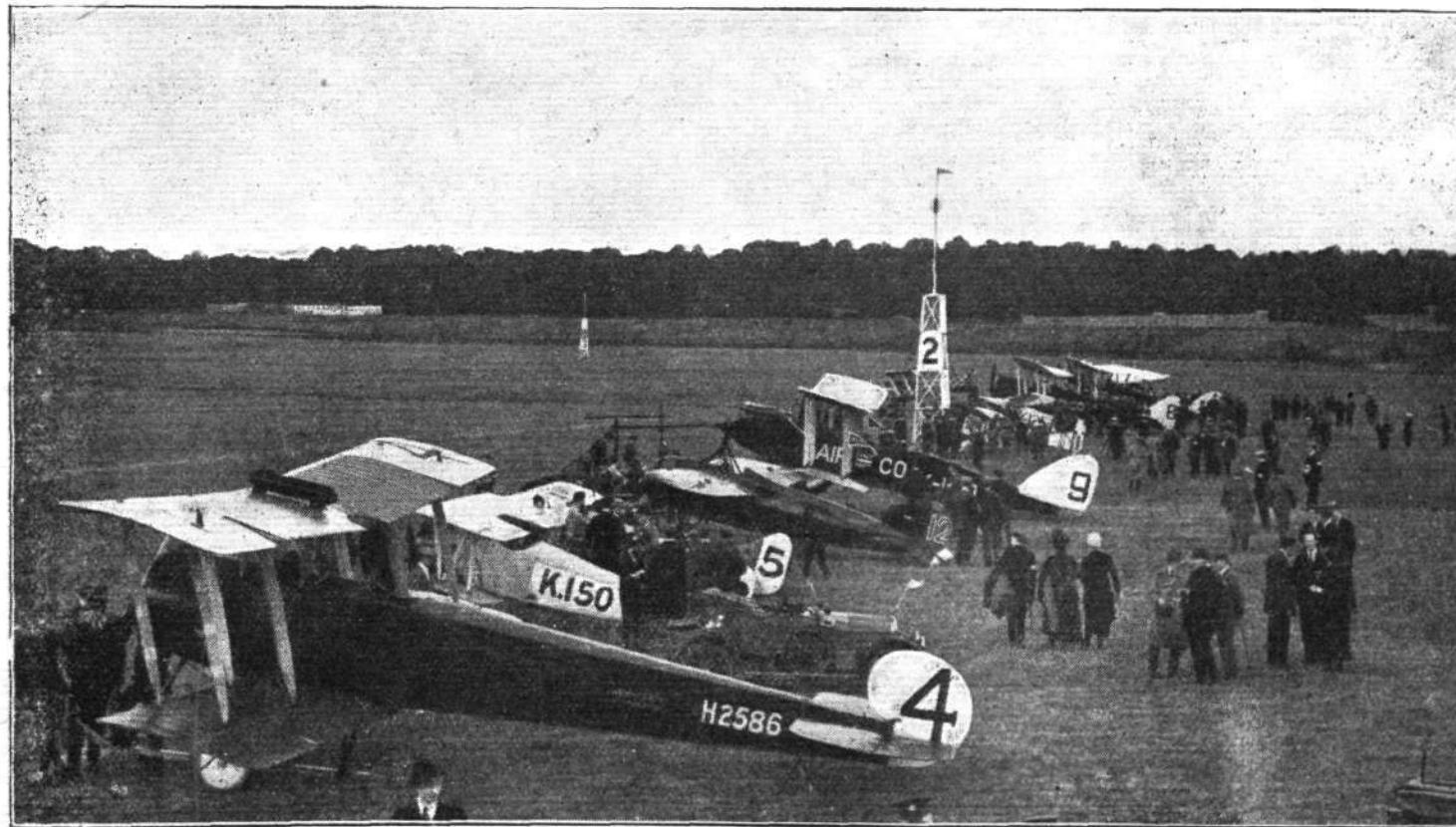


THE Fourth—or "Victory"—Aerial Derby, which was flown last Saturday afternoon, was an immense success in every way. It was also, we think, one of the most interesting aerial events—from the technical point of view, at any rate—ever held in this country. Although the attendance was not, perhaps, quite up to pre-War standard for similar events, it was nevertheless very good. No doubt the threatening character of the weather in the forenoon may have caused many to keep away—in fact, even up to the last moment

it looked as though the sport would be spoiled by heavy rain storms. However, from the time the last machine was started on its way the weather plumped for fine, and except for a strong gusty wind, conditions would have been ideal.

Visitors commenced arriving at Hendon quite early in the afternoon, and scored by getting the opportunity of witnessing some of the competitors making trial flights—in some cases, absolutely the first flights made by these machines, as for instance, in the case of the Airco 4 and 4R machines, the

| Order of Starting. | Pilot and Official Number. | Machine. | Engine. | Handicap. | Order in 1st Lap. | Order in 2nd Lap. |
|--------------------|------------------------------------|--------------------|------------------------------|-----------------|-------------------|-------------------|
| 1 | Capt. H. A. Hamersley (14) .. | Avro "Baby" .. | 35 h.p. Green .. | h. m. s. 1 25 0 | 10 | 7 |
| 2 | Lt.-Col. G. L. P. Henderson (4) .. | Avro .. | 110 h.p. Le Rhone .. | 57 0 | 9 | 6 |
| 3 | Capt. P. R. T. Chamberlayne (2) .. | G-W "Bantam" .. | 80 h.p. Le Rhone .. | .. | 8 | Down Epsom. |
| 4 | Maj. R. H. Carr (5) .. | G-W "Bantam" .. | 80 h.p. Le Rhone .. | .. | Down Hounslow | |
| 5 | Maj. C. H. C. Smith (12) .. | Bristol mono. .. | 110 h.p. Le Rhone .. | 29 0 | 7 | |
| 6 | Capt. H. J. Saint (9) .. | Airco 9 .. | 240 h.p. Siddeley Puma .. | 23 30 | 6 | 5 |
| 7 | C. B. Prodger (1) .. | B.A.T. "Bantam" .. | 170 h.p. A.B.C. Wasp .. | 16 0 | Down Fairlop. | |
| 8 | Maj. C. Draper (3) .. | B.A.T. "Bantam" .. | 170 h.p. A.B.C. Wasp .. | 13 20 | 5 | 4 |
| 9 | Marcus D. Manton (8) .. | Airco 4 .. | 375 h.p. Rolls-Royce .. | 9 30 | 4 | 3 |
| 10 | Capt. G. Gathergood .. | Airco 4R .. | 450 h.p. Napier Lion .. | Scratch | 1 | 1 |
| 11 | Lt. L. R. Tait-Cox (11) .. | Nieuport L.C.I. .. | 320 h.p. A.B.C. Dragonfly .. | 4 0 | 2 | Down W. Thurrock. |
| 12 | Lt. R. Nisbet (10) .. | Martinsyde F 4 .. | 275 h.p. Roll-Royce .. | 4 0 | 3 | 2 |



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THE AERIAL DERBY.—The competitors lined up at the starting line ready for the race.



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THE AERIAL DERBY.—The winner, Capt. G. Gathergood, A.F.C., on Airco 4 R, 450 Napier Lion engine, crossing the finishing line.

Result "Daily Mail" Trophy and "Shell" Prize

| | Pilot. | Machine. | Flying Time. | Speed. |
|---|--------------------------------|---------------------|-----------------------|--------|
| 1 | Capt. G. Gathergood | 450 Airco 4 R. | 1 27 42 | 129.34 |
| 2 | Lieut. R. Nisbet | 275 Martinsyde F. 4 | 1 31 3 $\frac{1}{2}$ | 124.61 |
| 3 | M. D. Manton | 375 Airco 4 | 1 36 41 $\frac{1}{2}$ | 117.39 |
| 4 | Maj. C. Draper | 170 B.A.T. Bantam | 1 37 7 | 116.78 |
| 5 | Capt. H. J. Saint | 240 Airco 9 | 1 51 55 | 101.43 |
| 6 | Lieut.-Col. G. L. P. Henderson | 110 Avro | 2 30 45 $\frac{1}{2}$ | 75.22 |
| 7 | Capt. H. A. Hamersley | 35 Avro Baby | 2 41 23 | 70.30 |

Result Sealed Handicap

1st prize, "Shell Trophy and 100 sovs.; 2nd prize, "Shell" Trophy and 50 sovs.; 3rd prize, "Shell" Trophy and 25 sovs.

| | Pilot. | Machine. | H'cap. Time. |
|---|--------------------------------|---------------------|-----------------------|
| 1 | Capt. H. A. Hamersley | 35 Avro Baby | 1 16 23 |
| 2 | Maj. C. Draper | 170 B.A.T. Bantam | 1 23 47 |
| 3 | Lieut. R. Nisbet | 275 Martinsyde F. 4 | 1 27 3 $\frac{1}{2}$ |
| 4 | M. D. Manton | 375 Airco 4 | 1 27 11 |
| 5 | Capt. G. Gathergood | 450 Airco 4 R. | 1 27 42 |
| 6 | Capt. H. J. Saint | 240 Airco 9 | 1 28 25 |
| 7 | Lieut.-Col. G. L. P. Henderson | 110 Avro | 1 33 45 $\frac{1}{2}$ |

latter only arriving (with a brand new engine) from the works that morning. Whilst visitors were arriving *via terra firma*, some visitors also came by air, viz., a Bristol fighter, two 50 h.p. L. and P. tractors (each with three up, including the champion heavyweight bantam, W. T. Warren, sen.), a few odd—numerically, of course—Service machines, and a Nieuport Nighthawk, piloted by an old Hendonian, J. H. James,

who has now joined the Nieuport firm. Mr. James gave us a very fine show of modern piloting, during which Lieut. Tait-Cox arrived on another Nieuport, which appeared to be extremely fast in spite of the check (blue and yellow) put upon it. The last to arrive by air was Mr. Harry Hawker, on a decidedly speedy Sopwith "Snapper," the performance of which brought it immediately into the front rank of favourites for the race.

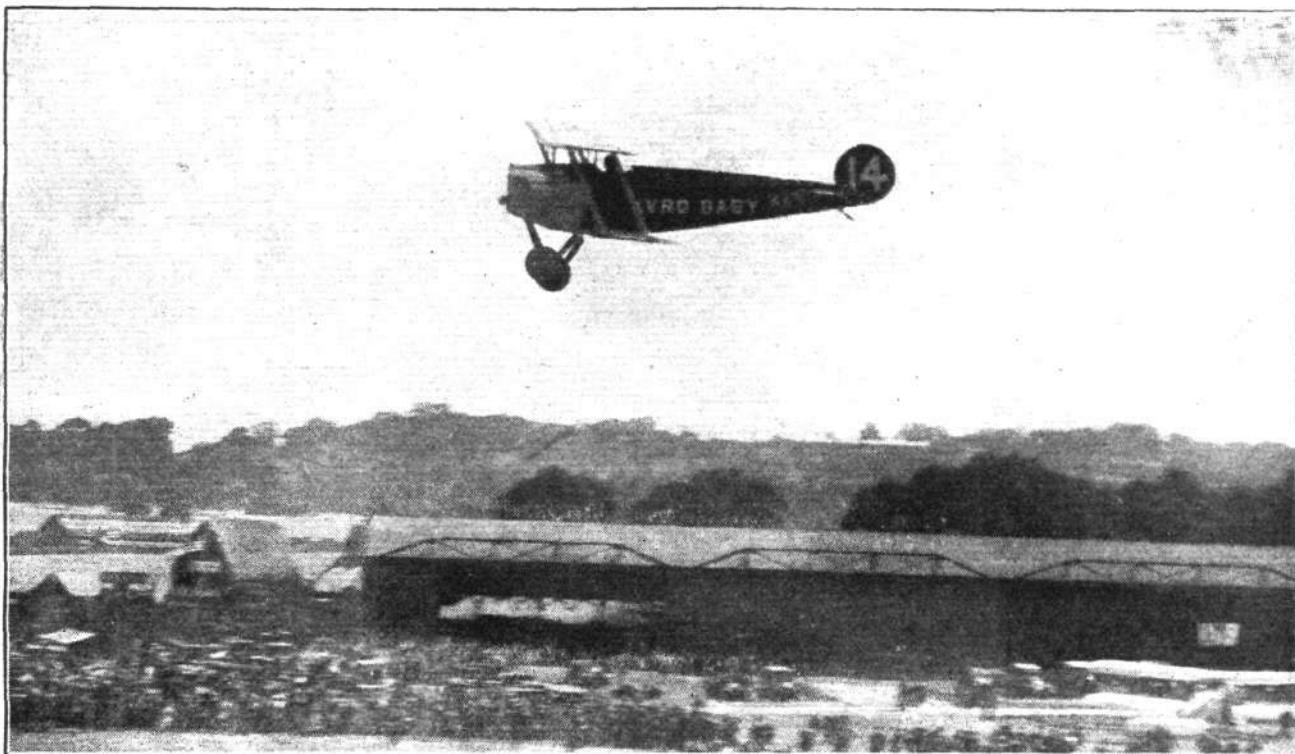
By three o'clock the enclosures began to be moderately filled with cars, wearers of gay gowns, and bookies. The latter were "laying the field" for all they were worth (not forgetting poor Hawker, although he had been officially "na-poed"), and above the roar of sundry aero engines one could hear cries of: "5 to 1 Gathergood, 6 to 4 Tait-Cox, 4 to 1 Nisbet," etc. Shortly before 3.30, H.M. Queen Alexandra and Princess Victoria, with Gen. Sir Dighton Probyn, V.C., Col. Sir Arthur Davidson, and the Hon. Charlotte Knollys, arrived from Marlborough House to see the sport. They were received by Mr. Claude Grahame-White and Mr. Herbert Matthews, and were conducted to a specially reserved enclosure. Other notable visitors were Gen. Sir F. H. Sykes (Controller-General of Civil Aviation), and Brig.-Gen. R. M. Groves.

By now a certain liveliness obtained, and machines were moved about from one position to another, engines given final tests, eventually all the competitors being lined-up in their correct positions on the starting-line at the end of the enclosure. At last all was ready, and at 3.52 the first competitor, the Avro Baby, was sent off. It was followed at half-minute intervals by the other machines, in the order shown in the accompanying table, each competitor getting off very speedily and making a sharply banked turn to the left at varying distances from the starting-line. Maj. Draper, on the "Hali-a-Bantam," made a very quick turn and climb and was soon out of sight. The last machine to leave was Lieut. Nisbet's Martinsyde. When that had got away, we settled down to watch passenger flights on Avros and Kangaroos, stunt flights by James on the Nieuport, and parachute descents by Prof. Newall. Some 45 minutes later the first competitor was seen returning on the first lap, the machine being easily recognised as Gathergood's Airco 4 R—a very distinctive machine. Soon after Gathergood crossed the line, Lieut. Tait-Cox on the Nieuport thundered by, followed closely by Nisbet on the Martinsyde. Then came Manton on the Airco 4, with Maj. Draper close behind on the B.A.T. Bantam. Meanwhile a megaphone man was informing us that the above-mentioned competitors had



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THE AERIAL DERBY.—Capt. Gathergood immediately after winning the race



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THE AERIAL DERBY.—Capt. H. A. Hamersley, M.C., on the Avro Baby, 35 h.p. Green engine, winner under the Sealed Handicap.

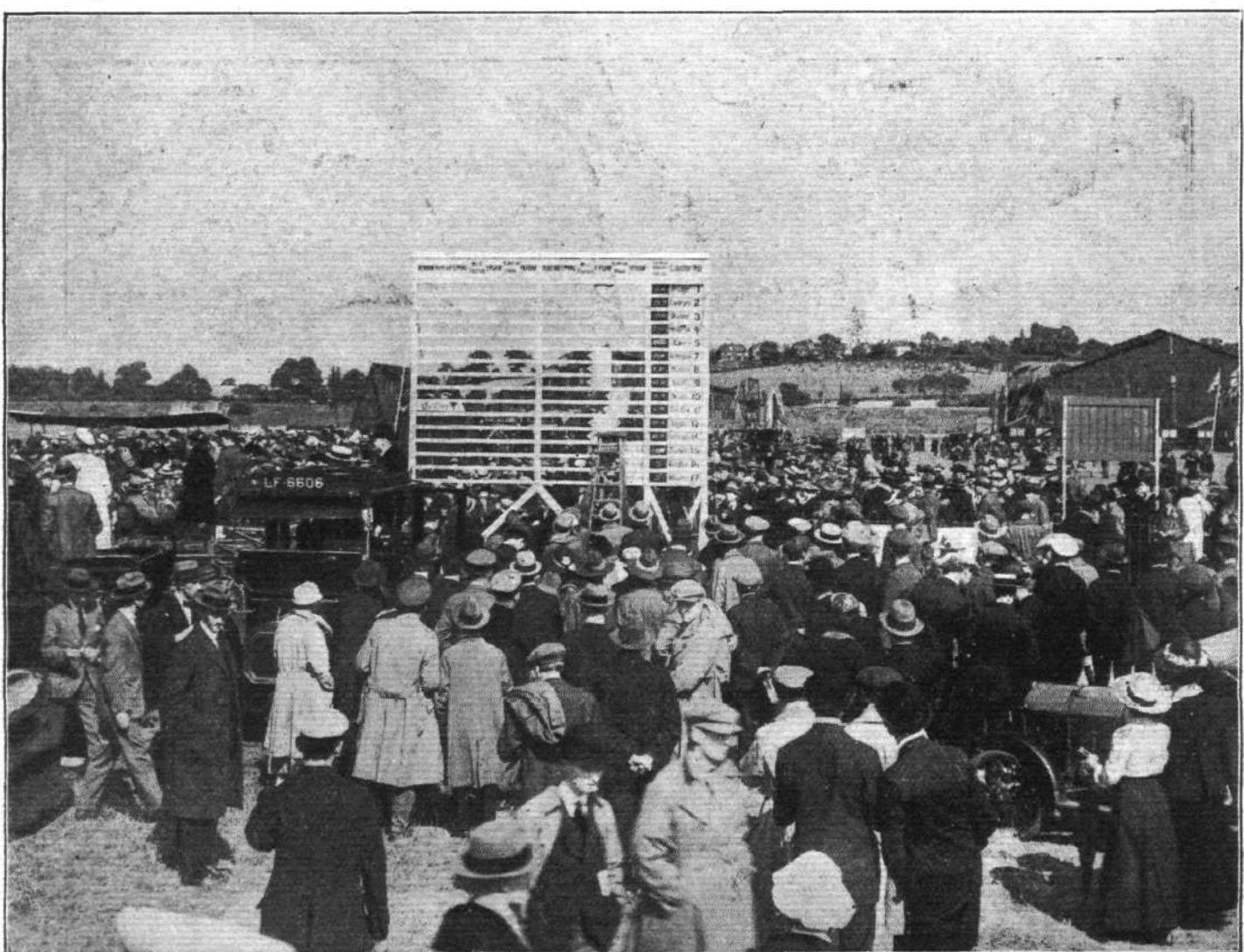


"Flight" Copyright.
Queen Alexandra signs the Visitors' Book at Hendon Aerodrome upon the occasion of the Aerial Derby, for Mr. Claude Grahame-White. In the background Princess Victoria and Gen. Sir Dighton Probyn in attendance.



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THE AERIAL DERBY.—Maj.-Gen. Sir F. H. Sykes presenting the Cup to the winner, Capt. Gathergood.



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THE AERIAL DERBY.—The crowd and the number-board in the enclosure, from which the race at all stages was able to be followed

passed Epping and Hertford! After a short interval Capt. Saint came along on the Airco 9, and a little later the Bristol monoplane was sighted slightly off the course. On reaching the aerodrome, Maj. Smith circled round and landed, apparently with engine trouble. We were then informed that Maj. Carr had been forced to land at Hounslow with engine trouble, and then the other G.W. Bantam passed over, piloted by Chamberlayne, only to be forced to land later at Epsom. After a comparatively long interval, Lieut.-Col. Henderson, on the Avro, completed the first lap, after which all eyes were anxiously turned for the arrival of the sporty little Avro Baby. This latter wonderbus floated by almost before we were aware of it, for its 10-year-old Green engine was remarkably silent. It did not seem very long after this that the cry went up that the first man on the second lap was sighted, and the excitement to see who it was grew intense, for judging by the times of the first lap, both the Nieuport and the Martinsyde looked as though they would fly the Airco 4 R. pretty close. As the first machine drew near the distinctive form of the latter machine was easily recognised, and sweeping past the line amidst enthusiastic applause the victor wheeled round and landed neatly in the centre of the aerodrome, where there was a rush of people to welcome him and carry him shoulder-high to be presented to Queen Alexandra.

Whilst these demonstrations were in progress, a second machine arrived, and this proved to be Nisbet's Martinsyde, which, after crossing the line, made a very pretty landing, and taxied up to the enclosure. Presently two machines were seen approaching the aerodrome very close together. These were Manton's Airco 4 and Draper's B.A.T. Bantam. They crossed the line with only a matter of seconds between them, and it was doubtful for some time who had won third place. There was a certain amount of disappointment in some quarters at the non-arrival of the Nieuport, which, it transpired, had to come down at West Thurrock with a punctured carburettor float. The remaining Airco machine, piloted by Saint, was not long in reaching home, and at about 6.30 Henderson on the Avro brought his exceedingly plucky and meritorious flight to a conclusion, which, judging by the fact that he did not lose any too much time in landing after crossing the line, he was very glad to do. A few minutes after a cheer went up. It was the arrival of the Baby. There was undoubtedly something about the performance of this precocious infant that appealed to everyone—and it did it with such apparent ease and without the slightest fuss. Just 190 miles at an average speed of 70 m.p.h. in a wind certainly round about 30 m.p.h. And this after a flight from Southampton that same morning!

Before finally putting the Baby to bed—and about time



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THE AERIAL DERBY.—The starter, Mr. C. T. Glazebrook, at work, with Maj. Ledeboer handicapping.

too at this late hour—its nurse put it through some astonishing acrobatics, beyond description in mere words. Suffice it to say that it did practically everything that the modern larger machines can do—and we are not so sure that it did not do them better. And so ended a very interesting Aerial Derby.

THE MACHINES

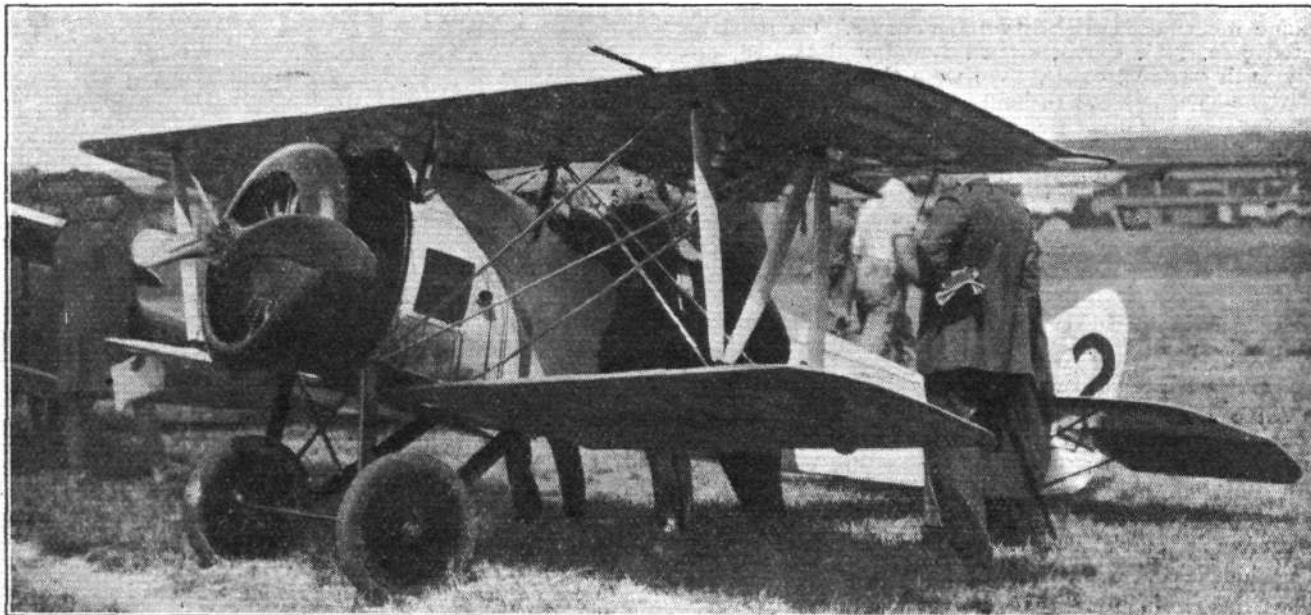
OWING to the fact that a certain amount of secrecy was maintained in regard to some of the machines entered for the Aerial Derby, a few of the identification diagrams published in FLIGHT last week were, we are afraid, a little inaccurate.

Naturally enough, the firms who had entered machines were not over anxious to give away too much information about them before the race, hence in a few instances the silhouettes were a little misleading. However, this week we are in a



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No. 1.—The B.A.T. Bantam flown by Mr. C. B. Prodrer. The engine is a 170 h.p. A.B.C. Wasp.



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No. 2.—The Grahame-White Bantam, 80 h.p. Le Rhone, flown by Capt. P. R. T. Chamberlayne. A similar machine, No. 5, was piloted by Maj. R. H. Carr.

position to give photographs of all the starters, with a brief description of each. The machines will be dealt with in the sequence of their official numbers in the race, and not according to the place they obtained in the result.

No. 1.—The B.A.T. Bantam, 170 h.p. A.B.C. Wasp

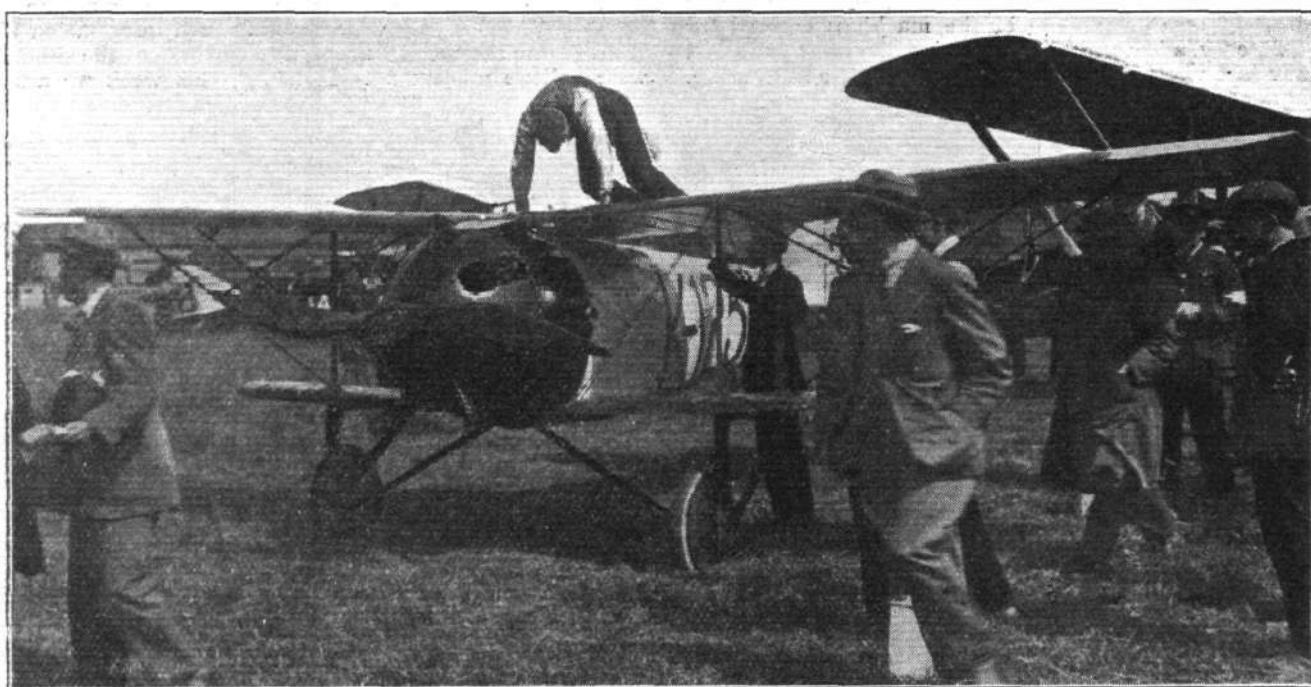
This machine, which was piloted by Mr. Clifford B. Prodger, is the standard Bantam. It has a *monocoque* body of excellent streamline shape, and is chiefly remarkable on account of the placing of the top plane low over the body and with no stagger in relation to the bottom plane. Also the undercarriage struts are attached to the bottom plane instead of, as is more usual, to the body direct. This placing of the chassis has the advantage of giving a very wide wheel track. The pilot is placed in a circular opening cut in the top plane, where his eyes are on a level with the plane. The view is, therefore, exceptionally good in all directions except straight down, where the bottom plane obstructs it to a certain, although small, extent. The machine is very fast, climbs well, and is manœuvrable to a remarkable extent.

No. 2.—The Grahame-White Bantam, 80 h.p. Le Rhone

Two of these machines started in the race. Except for the colours in which they were painted, the two machines were alike. No. 2 was piloted by Capt. P. R. T. Chamberlayne, while the other machine, No. 5, was flown by Maj. R. H. Carr. The G.W. Bantam was described in FLIGHT recently, when sketches of constructional details were given. It has a top plane of slightly greater dimensions than the bottom one, the two being separated by one pair of inter-plane struts on each side. These struts are of N formation, as seen in the side elevation. The machine is very small, in fact it was the smallest machine entered for the Aerial Derby as regards size, although not as regards power. It is very sensitive on the longitudinal controls, and gives the impression that it could do with a larger tail plane, or smaller elevators, or possibly both.

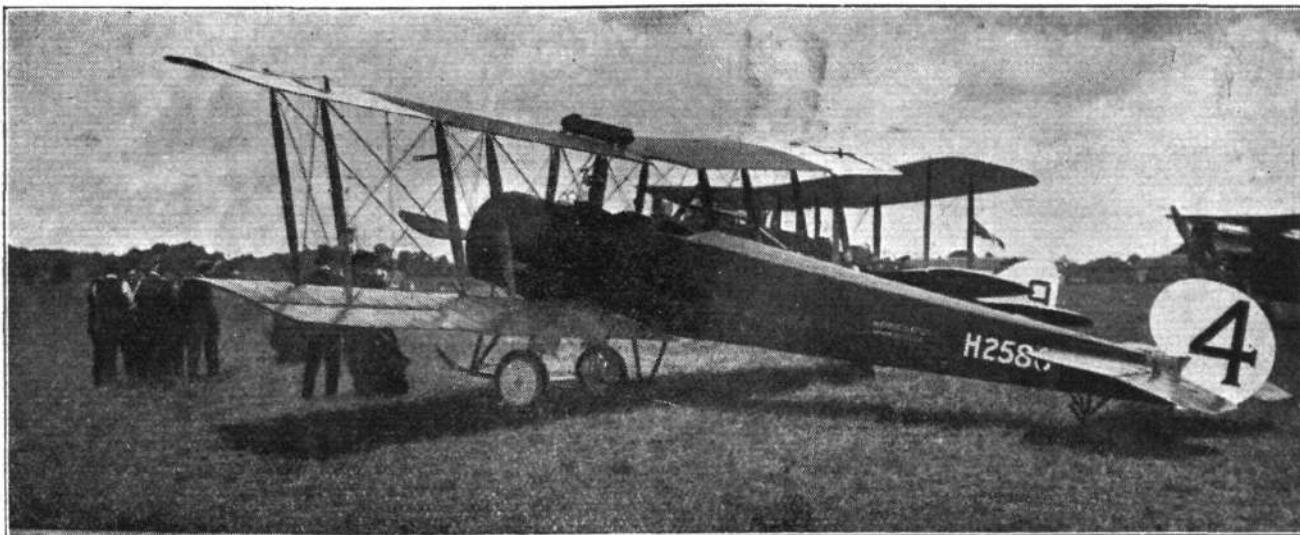
No. 3.—The B.A.T. Bantam, 170 h.p. Wasp

With the exception of the short bottom plane, and consequent difference in strutting, this machine is a standard



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No. 3.—The B.A.T. Bantam, 170 h.p. A.B.C. Wasp, flown by Maj. C. Draper. This machine is the standard Bantam, except that its bottom plane has been cut down in size.



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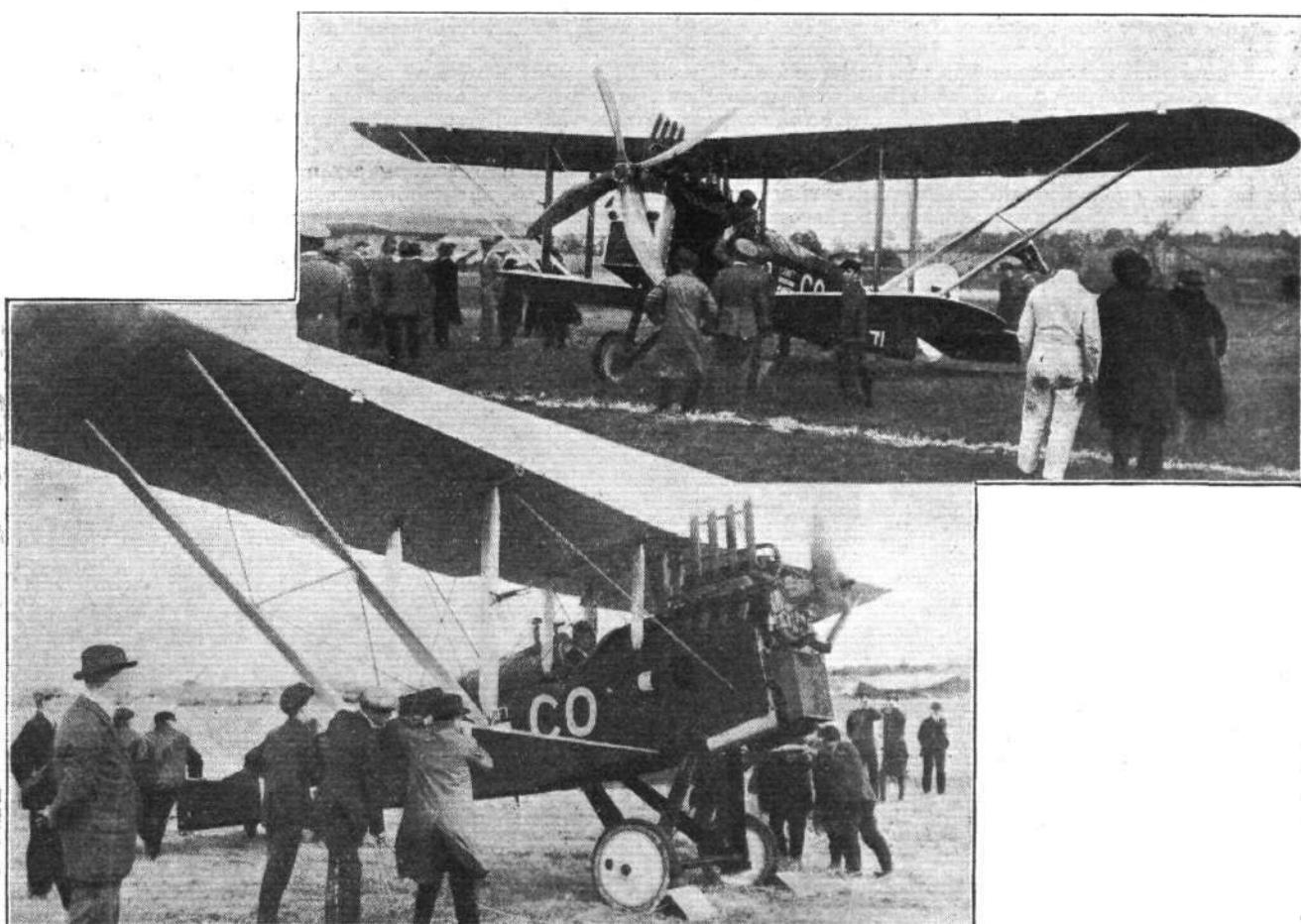
No. 4.—The Avro Biplane, 110 h.p. le Rhone engine, flown by Lieut.-Col. G. L. P. Henderson, in place of the Martinsyde F 4, Rolls-Royce Falcon engine, originally entered.

Bantam, similar to No. 1. It was flown by Maj. Draper, who was to have flown the little new B.A.T. sporting two-seater, the F.K. 27. This machine, however, was not finished in time and hence Maj. Draper flew No. 3. This fact deprived Capt. Vaughan of a mount, and as the B.A.T. five-seater, F.K. 26, was slightly damaged on Saturday morning, she was not able to start in the race, and thus another B.A.T. pilot, Lieut. Turner, was without a machine when the race started.

No. 4.—The Avro Biplane, 110 h.p. Le Rhone engine

This machine was flown by Lieut.-Col. G. L. P. Henderson,

as he could not, we understand, get permission from the Air Ministry authorities to use the Martinsyde F. 4 originally entered. The Avro two-seater is so well known as to need little description here. Suffice it to point out that to all intents and purposes she is the same machine—with an engine of higher power—as the original Avro two-seater of 1913, which had an 80 h.p. Gnome. Needless to say that, matched against modern machines of high power, the Avro had little chance of winning the Derby, although the somewhat hopeless position was, to a certain extent, mitigated by the fact that a sealed handicap was flown in connection with the Derby. Lieut.-Col. Henderson is to be congratulated upon his de-



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Two views of No. 7, the Airco 4R, 450 h.p. Napier Lion, flown by Capt. G. Gathergood. This machine was the winner of the Aerial Derby.



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No. 8.—The Airco 4, 375 h.p. Rolls-Royce "Eagle," flown by Mr. M. D. Manton.

termination and perseverance in completing the course, and certainly was deserving of a more modern mount.

No. 5.—The Grahame-White Bantam, 80 h.p. Le Rhone
For this machine, see note dealing with No. 2.

No. 7.—The Airco (de H.) 4 R., 450 h.p. Napier Lion

In connection with racing it is customary to speak of "dark horses," and one of the dark horses of the Derby was the Airco 4 R., piloted by Capt. G. Gathergood. This machine was not, we believe, finished until the day before the race, and she was, therefore, somewhat of an unknown quantity. As will be seen from the accompanying illustrations, the machine is a de H. 4, with the bottom plane cut down to a minimum, with a consequent re-arrangement of the strutting. The large extensions of the top plane are supported by long sloping struts, while the fact that the greater part of the wing area is included in the top plane has rendered it necessary to get the thrust line placed higher than it is in the standard machine. This is accomplished by placing the Napier engine on the top of the nose of the *fuselage*, the radiator being placed below the engine, across the nose. Judging from the speed of the machine this arrangement seems to have been successful as regards performance, although the uncovered engine and the flat nose cannot be said to have improved the appearance. The whole thing gave the impression of a compromise, hurriedly carried out, having for its object the obtainment of speed by piling on power and cutting down wing surface. In so far as winning the race is concerned, this object was attained, but the machine should be looked upon from that point of view only.

No. 8.—The Airco (de H.) 4, 375 h.p. Rolls-Royce Eagle

This machine, piloted by Mr. M. D. Manton, is a standard Airco (de H.) 4, with the passenger's seat covered in so as to reduce resistance. In its time this type was one of the most successful two-seater fighters of the War. It has been fully described in FLIGHT, and for particulars of it we would refer our readers to the Airco "Milestones" series in our issue of January 9, 1919, and to a detailed description published on June 20, 1918. In one form and another this type has already done much commercial work since the signing of the Armistice; as, for instance, the Airco 4A (with enclosed cabin for the passenger) which has been regularly employed in carrying Peace Delegates to and from Paris. A later edition, the Airco 16, is very similar to the 4A, but carries four passengers.

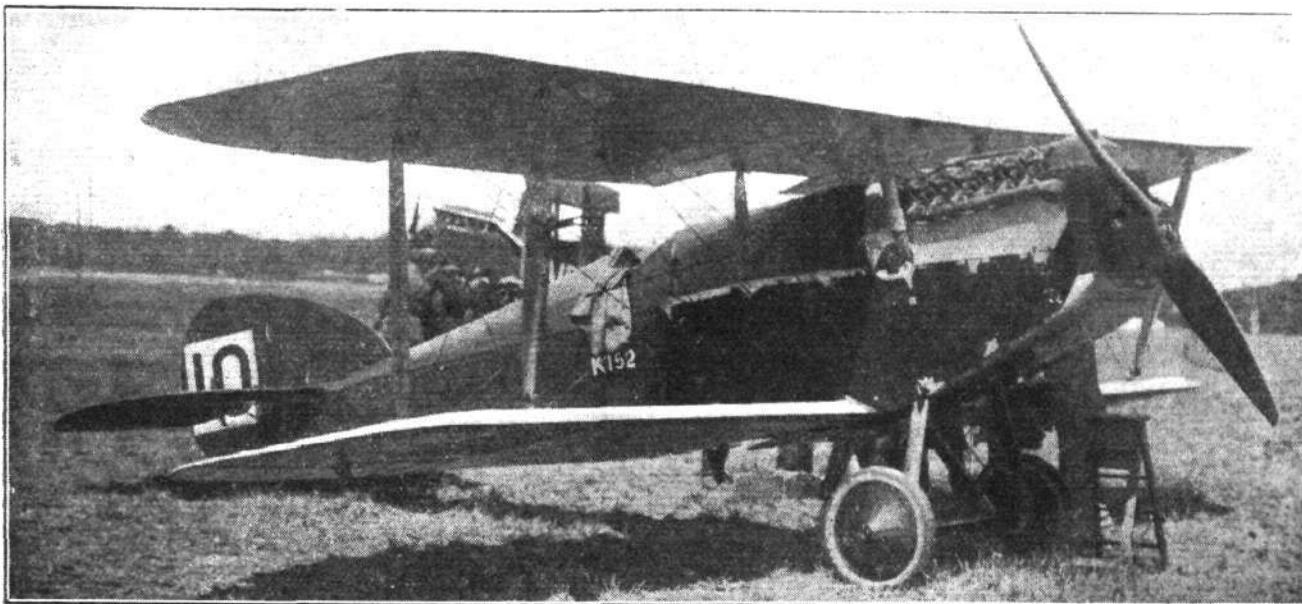
No. 9.—The Airco (de H.) 9, 230 h.p. Siddeley Puma

Except for the fact that an extra seat has been fitted for passenger work since the War, the Airco 9, flown by Capt. H. J. Saint, is the standard Airco 9. It is a very pretty machine, and has a good performance for its power. Owing to the fact that a vertical engine is fitted, it has been possible to keep the nose of the *fuselage* very narrow and pointed, which gives the machine a very graceful appearance. The radiator protrudes through the covering of the bottom of the body, and it can be raised or lowered to vary cooling. With the new seating arrangement the pilot occupies the middle seat, the passengers sitting in front and behind him respectively. As all the seats are placed well back, a very good view is obtained, which is a great advantage for a machine used for passenger carrying.



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No. 9.—The Airco 9, 230 h.p. Siddeley Puma, flown by Capt. H. J. Saint.



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No. 10.—The Martinsyde F.4, 275 h.p. Rolls-Royce Falcon III, flown by Lieut. Robert Nisbet.

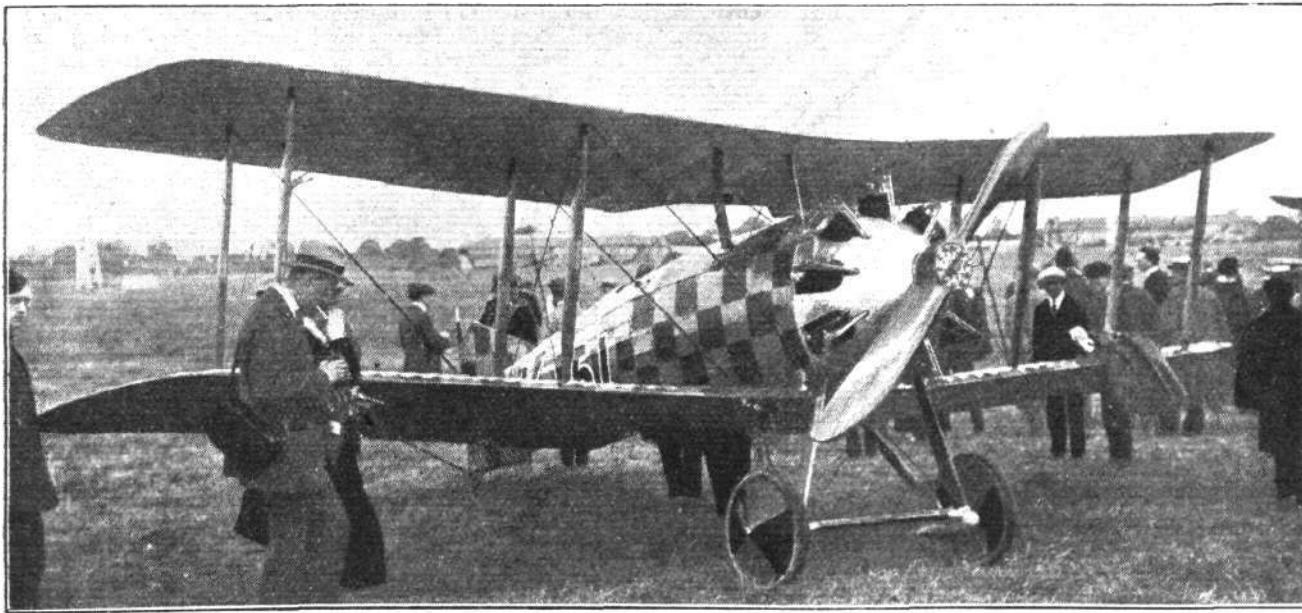
No. 10.—The Martinsyde, F.4, 275 h.p. Rolls-Royce Falcon

In the main the Martinsyde biplane flown by Lieut. Robert Nisbet was the standard F.4, which type has to its credit the fastest climb and speed at great heights, as well as the speed record for the Paris-London flight (1 hr. 15 mins.). The F.4 is one of the most beautiful aeroplanes we have ever seen, quite apart from her qualities as a flying machine. There is positively not an ugly line or curve in her. As all the Martinsyde productions, she is beautifully finished in every detail, yet the construction is such as to be a sound production job. The body, which is very deep in front, is covered with three-ply in front, and shows the numerous external duralumin fittings which one always associates with the Martinsyde machines. The deep coaming in front of the pilot has "tumble-home" sides, and as the body is not very wide the pilot's view forward is not restricted to nearly the extent that might be expected. The top fairing of the fuselage behind the pilot comes to a sharp edge, which adds greatly to the appearance of the machine. A feature of all the Martinsyde biplanes is the manner of attaching the bottom plane to the fuselage. There are short wing roots permanently attached to, and situated below, the bottom of the fuselage. To these roots are attached the two bottom wings. The break in the lines caused by the bottom spars below the body is faired off with an aluminium plate which

is so bent as to carry the fuselage bottom along from the nose to the pilot's seat in easy curves. All these things may appear of little importance, but they contribute their share towards the graceful appearance of the machine, and, incidentally, they probably have quite a lot to do with the performance.

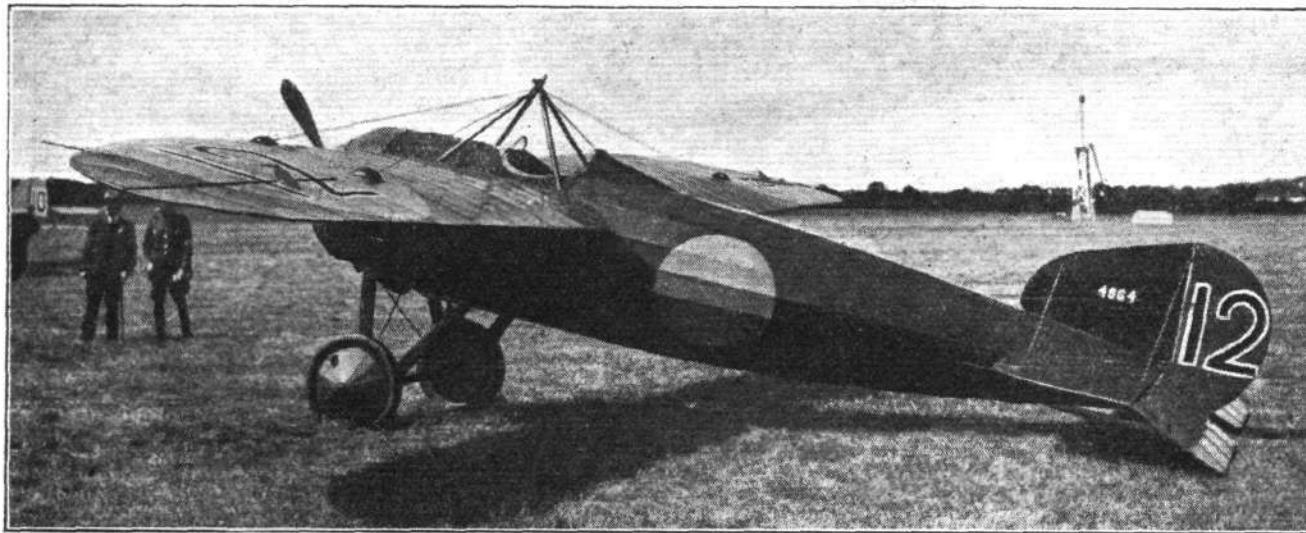
No. 11.—The Nieuport L.C. 1, 320 h.p. A.B.C. Dragonfly

Generally speaking, the Nieuport biplane entered for the Aerial Derby was very similar to the standard Nieuport Nighthawk. It is, however, designed as a two-seater, although in the race it had the passenger's cockpit covered in. As recorded elsewhere in this issue, the machine, which was piloted by Lieut. L. R. Tait-Cox, had engine trouble and was obliged to retire from the race, but this is not necessarily any criterion of the capabilities of the machine. The cause of the engine trouble was one that might have happened to any engine, on any machine, and certainly the Nieuport L.C. 1 shows a very good performance, both as regards speed, climb and manœuvrability. It might be mentioned that the letters L.C. 1 stand for Land Commercial No. 1. A feature of the L.C. 1, which it shares with the Nieuport Nighthawk, is the extensive employment of wood, the number of metal parts having been reduced as far as possible, while in no single instance are any of the few metal fittings that carry loads built up by the use of welding. In spite of the relatively small cross section of the fuselage, the cockpits are



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No. 11.—The Nieuport L.C. 1, 320 h.p. A.B.C. Dragonfly, flown by Lieut. L. R. Tait-Cox.



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No. 12.—The Bristol Monoplane, 110 h.p. le Rhone, flown by Maj. C. H. C. Smith.

very roomy, and the arrangement of the various instruments, etc., has been most carefully thought out.

No. 12.—The Bristol Monoplane, 110 h.p. Le Rhone engine

This machine was briefly described in the Bristol "Milestones" series published in our issue of January 23, 1919. The chief feature of it is the unusual shape of the wings, which are of very deep section, and have their leading edges swept back in a curve which gives the wings an appearance of being crescent-shaped. For visibility this machine is excellent, since the pilot sits between the wing spars where these cross the body. The only direction in which the wings obstruct the view is downwards, but this has been remedied by cutting slots in the wings near the sides of the fuselage. The latter, it will be seen, is of circular, streamline shape, and the whole machine has been designed for low resistance. Thus the wing bracing has been reduced to one wire per spar on each side. This is rendered safe by the employment of a very deep wing section, as already mentioned. Lateral control, on account of the thick wings, is by means of ailerons and not, as was the case in nearly all monoplanes before and during the early part of the War, by warping.

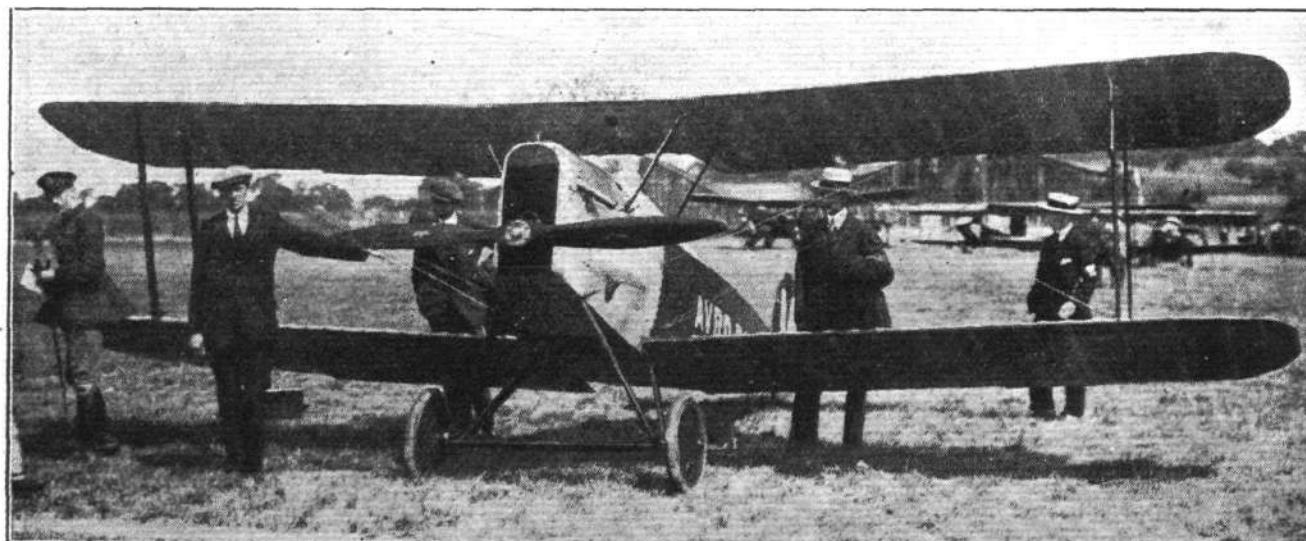
No. 14.—The Avro Baby, 35-40 h.p. Green

Although not generally realised by the majority of the visitors to Hendon, nor by the greater part of the daily Press, the performance of the little Avro Baby, piloted by Capt. Hamersley, was the feature of the Aerial Derby. It demonstrated that, even on a windy day, it is not essential

to have at one's disposal an engine of very high power in order to make a cross-country flight of considerable duration and distance. With the great engines used on War machines in order to get ultra-high performance there is the tendency to form the opinion that such powers are essential to peacetime machines as well. The Avro Baby has demonstrated that this is not so, and that the private owner of a machine fitted with an engine of very moderate power—and, incidentally, of low cost and upkeep—may count on being able to make cross-country flights on a reasonably great percentage of days throughout the year. As the machine is fully described elsewhere in this issue, no detailed reference need be made to it here. Suffice it to say that after the race Capt. Hamersley gave a very fine demonstration of "stunting," the little machine being capable of all the tricks indulged in by its bigger brothers. Add to this that she lands at a little over 30 m.p.h., and gets off very quickly, and it will be seen that the Avro Baby forms an ideal machine for the private owner.

No. 17.—The Sopwith Biplane, 320 h.p. A.B.C. Dragonfly

When Mr. Hawker on his Sopwith biplane arrived shortly before the start of the Aerial Derby it was thought by many that after all the Air Ministry had withdrawn their prohibition, but this impression was soon dispelled by Mr. Hawker, who, on landing, informed us that he had been unable to obtain the necessary permission, the reason given being, we believe, that the Dragonfly engine was Government property. The



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No. 14.—The Avro Baby, 35-40 h.p. Green, flown by Capt. H. A. Hamersley. This machine won the sealed handicap.



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No. 17.—The Sopwith Biplane, 320 h.p. A.B.C. Dragonfly, which was to have been flown by Mr. H. G. Hawker. The authorities, however, refused to give permission for the machine to take part, the reason given, we believe, being that the engine was Government property. This attitude on the part of the Government naturally caused very keen disappointment.

disappointment caused by this decision was very keen indeed, as the majority of the visitors had looked forward to seeing Hawker in this famous race. The machine, which was to have carried the official number 17, is a single-seater with one pair of struts on each side. It has the usual arrange-

ment of the centre section struts, which are sloped outwards, and there is a strong family resemblance to previous Sopwith machines, although it would be difficult to state which type she resembles most. The machine is, we believe, known as the Sopwith Snapper.

ROYAL AERO CLUB AND

ON Monday evening, at the Savoy Hotel, another family gathering of members of the Club took place to give welcome to Capt. Sir J. Alcock and Lieut. Sir A. W. Brown upon their achievement in flying the Atlantic in one stage upon the Vickers Vimy-Rolls-Royce aeroplane. About 300 members were present, the chair being taken by Brig.-Gen. The Duke of Atholl, K.T., M.V.O., etc.

The Chairman, after reading letters of regret for non-attendance of the Prince of Wales and many men of note, proposed the health of the two guests. He said that they had met together purely as private club members, and not as a public body, to welcome and do honour to their two guests. In offering them their congratulations, he could assure them all joined in that hearty demonstration of good will, whether they were those who had attempted the venture and gloriously failed, or whether they were those who still intended to make the attempt after them, in their great and successful effort in the interests of progress. Continuing, the Duke of Atholl said this flight could never have taken place except for the faith and patience of the early pioneers. They took many risks and spent much money. That faith had been now more than rewarded a thousand-fold. The Chairman then recalled the names and work of many of our greatest pioneers, many of whom had already passed away. In conclusion, he could not refrain from saying how greatly they appreciated the honour that the King had conferred upon two members of their Club. He should, too, be ungracious did he not acknowledge how indebted the flying men were to Lord Northcliffe and the *Daily Mail* for the prizes they had given, as also to the proprietors of the State Express Cigarettes and Mr. L. R. Phillips for additional prizes, which had made the great venture economically possible. He was sure they would all be glad to hear that Lord Northcliffe was making good progress after his recent operation. The highest honour that the Club could confer on airmen was the gold medal of the Royal Aero Club. The Committee of the Club at its last meeting unanimously decided to confer the medal on Capt. Sir J. Alcock and Lieut. Sir A. Brown, and he therefore handed one to each of them, with their best wishes and congratulations.

Gen. Sir J. E. B. Seely announced, amid loud cheers, that "the Germans have signed the Peace. Three cheers for the

THE ATLANTIC FLIGHT

Allies! Three cheers for the King." Gen. Seely added that he did not think that any man had ever had the chance of making a better speech. He rejoiced in being able on behalf of the Air Ministry to congratulate the two airmen; it was a fitting way to celebrate victory. There was no shade of jealousy between us and the United States.

Gen. Sir F. H. Sykes, in seconding the toast, said there was a point always to be remembered. It would not have been possible for the R.A.F. to have done what they had without the help of the constructors of the machines, the engines and accessories. In addition, there was the work of the Royal Aero Club to acknowledge, which had been magnificent in helping forward the movement. It was the case of a great partnership between the R.A.F. and the Royal Aero Club, which he hoped would continue in Peace as in War. The next two years, he thought, would be a very trying time for all concerned, but he had no doubt of the ultimate issue.

Capt. Sexton, U.S.N., expressed the appreciation of the U.S. Navy in Europe of the splendid flight of the two guests. Referring to the time of the steamship services in regular use, by way of contrast, he pointed out that had the Vickers Vimy started from Newfoundland on the morning of June 14, the machine would have landed in Ireland before the setting of the sun the same day.

Capt. Sir J. Alcock, in responding, paid tributes to those who had contributed to the success in making the preliminary arrangements, to the designer and builders of the machine, the Rolls-Royce engine and to the mechanics on this and the other side, who worked day and night to ensure everything being in perfect order. Finally, he acknowledged the help which the favourable wind afforded them.

Lieut. Sir W. Brown said they were the victims of lucky circumstances, assisted by the experience of previous workers and achievements which had been at their disposal. Had it not been they who had made the flight, it would have been surely some one else who had succeeded.

Amongst the other speakers were Mr. Douglas Vickers, whose firm was responsible for the machine; Mr. Claude Johnson, Managing Director of Rolls-Royce, Ltd.; Mr. Peirson, the designer of the Vickers Vimy machine; and Sir Andrew Caird, who proposed the toast of the Chairman.

From Italy to Spain

AN aeroplane, which is reported to have been given by Messrs. Ansaldo and Co., the well-known Italian armament firm, to the Spanish Government, arrived in Madrid on Saturday, having flown from Barcelona over Tarragona to the capital in 3 hours 15 minutes. The pilot was Lieut. Grasse.

Fire at St. Cyr

St. Cyr, the French military flying ground near Paris, was the scene of a disastrous fire on June 21 which destroyed 18 hangars, two stores, 100 aeroplanes, and large stocks of material. The damage is estimated at 4,000,000 francs (£150,000).

THE "DAILY MAIL" £10,000 ATLANTIC PRIZE

CAPT. J. ALCOCK, D.S.C., and Lieut. A. Whitten Brown, the winners of the *Daily Mail* prize of £10,000 for the first direct aeroplane flight across the Atlantic, were entertained at luncheon at the Savoy Hotel by the directors of the Associated Newspapers, Ltd., on June 20, when the cheque for £10,000 was presented to the successful pilot by Mr. Churchill, the Secretary of State for War.

In the absence of Lord Northcliffe, Mr. Thomas Marlowe, Chairman of the Associated Newspapers, Ltd. and Editor of the *Daily Mail*, presided. On the chairman's right sat Capt. Alcock, and on his left Lieut. Brown.

The following were among the guests:—The American Ambassador, Mr. Churchill, the Lord Chief Justice (Lord Reading), the Lord Mayor, the Greek Minister, the Serbian Charge d'Affaires, Sir Arthur Stanley, Sir George Perley, Sir Edgar Bowring, Sir Joseph Ward, Sir Thomas Mackenzie, Lord Knutsford, the Postmaster-General, Lord Burnham, the Lord Mayor of Manchester, Lord Inchcape, Lord Inverforth, Lord Emmott, Lord Blyth, Lord Morris, Mr. Cecil Harmsworth (Under-Secretary for Foreign Affairs), Maj.-Gen. Sir F. Sykes, Brig.-Gen. Sir Capel Holden, Mr. Laurence R. Phillips, Maj.-Gen. Ashmore, Brig.-Gen. Eugene Gerrard, Brig.-Gen. Caddell, Col. and Sheriff William R. Smith, Sheriff Banister Fletcher, Brig.-Gen. Maitland, Sir Vincent Caillard, Sir Trevor Dawson, Sir George Sutton, Sir Andrew Caird, Sir William Beardmore, Sir Campbell Stuart, Rear-Admiral Sir Charles Ottley, Sir R. Kindersley, Sir Arthur Robinson, Maj.-Gen. Sir Hugh Trenchard, Mr. Douglas Vickers, Mr. Claude Johnson, Mr. Hildebrand Harmsworth, Sir James Stevenson, Consul-General W. Hollis, Sir Herbert Creedy. The Chairman of Lloyd's (Mr. C. I. de Rougemont), Mr. H. G. Hawker, Sir James Hill, Sir Malcolm Fraser, Sir Robert Hadfield, Sir Edward Holt, Mr. G. Isaacs, Mr. Bruce Ismay, Com. H. Perrin, Sir Thomas Lipton, Lieut.-Com. Ramsey (U.S. Navy), Sir Henry Dalziel, Col. Ewart, Sir Edward Hulton, Sir Guy Standing, Mr. R. K. Pierson, Maj.-Gen. Swinton, Maj. Evelyn Wrench, Sir Harry Brittain, Col. Fox, the Hon. J. A. Smith, Mr. Arthur C. Brown, Col. Walter Faber, Maj. D. Kennedy, the Mayor of Ealing (Mr. S. J. King), Maj. R. H. Mayo, Mr. R. P. Wilson, Mr. J. Alcock, Senr., Sir Woodman Burbidge, Mr. Wareham Smith, Sir William Treloar, Sir Charles Wakefield, Mr. Clynes, M.P., Sir Frank Newnes, Sir William Robertson Nicoll, Sir C. Phillips, Mr. Handley Page, Lieut.-Col. Pierce, Sir Thomas Royden, Sir Marcus Samuel, Sir Howard Frank, Col. Franklin, Maj. J. Murray, U.S.A., Gen. Mason, Sir Herbert Morgan, Sir Basil Thompson, Maj. H. A. Timewell, Capt. Mansfield Cumming, Maj.-Gen. Sir David Watson, Col. Warwick Wright, Mr. H. G. Wells, Mr. H. F. Woodington, Capt. West, V.C., Capt. Acland, Capt. Armstrong, Col. Blandy, Mr. G. B. Cockburn, Com. R. Henniker Heaton (R.N.), Sir Roderick Jones, Mr. Hamilton Fyfe, Mr. Charles E. Hands, Mr. W. Lints Smith, Mr. Basil Johnson, Capt. Passman, Mr. Richard Preston, Mr. Gordon Selfridge, Col. Towler, Lieut. Francis T. Sanford, Mr. W. G. Emery, Lieut.-Col. Ivor Fraser, Mr. H. G. Price, Mr. Stanley Spooner, Mr. Gordon Stiles, Mr. Ben Tillett, Mr. Van der Veer, Mr. A. W. Joshua, Mr. J. Lawrie, Mr. C. G. Grey, Mr. Sydney Pickles, Maj.-Gen. Ruck, Capt. Sexton (U.S. Navy), Maj. Heckstall Smith, Mr. L. Harkland Swan, Mr. H. T. Vane, Mr. W. Tarrant, Sir Samuel Waring, Mr. J. B. Whitelaw, Mr. George White, Sir Francis Barker, Maj. F. C. Buck, Sir George McLaren Brown, Mr. Frank Hedges Butler, Maj. Bernard, Maj. Blake, Lieut.-Col. A. J. Cole, Maj. Hamilton, Capt. Morgan, Mr. T. O. M. Sopwith, Mr. Oswald Short, Mr. Eustace Short, Mr. H. J. Bostock, Capt. Brown, Maj. Blackley, Mr. R. O. Cary, Lieut.-Col. A. S. Cleaver, Mr. E. R. Calthrop, Capt. Caroll, Mr. Louis Coatalem, Mr. Chester Fox, Mr. C. F. Fairey, Col. Spenser Grey, Mr. Eric Gamage, Maj. Gendle, Col. Hubbard, Col. Lyons, Mr. A. Phillips, Mr. H. G. M. Phillips, Mr. F. E. Bussy, Mr. J. H. Barnard, Mr. A. E. Canney, Capt. G. F. Sexton, Mr. M. J. Clifford, Capt. M. Neyland, Mr. T. E. Mackenzie, Mr. Alec Ogilvie, Mr. C. G. Greenhill, Mr. S. Hirst, Col. Hoyle, Mr. Harry L. L. Hepton, Maj. Proctor Humphries, Mr. L. W. Hoey, Mr. J. E. Hutton, Lieut. G. J. Hearne, Mr. Joynson-Hicks, M.P., Mr. E. M. C. Instone, Mr. J. W. Isherwood, Mr. Keith Jones, Lieut.-Col. F. K. M'Clean, Mr. Charles Marston, Mr. G. A. Maxwell, Mr. H. V. Martin, Mr. Guy V. Petter, Mr. Percy Richardson, Mr. Herbert C. Ridout, Lieut. C. P. Robertson, Lieut. C. C. Hicks, Mr. Harry Smith, Mr. J. Sutcliffe, Mr. W. Sexton, Mr. W. Street, Mr. J. S. Parker, Mr. G. L. Millin.

The chairman, in proposing the health of Capt. Alcock and Lieut. Brown, said that the Prince of Wales had sent a

letter expressing his sincere regret that, owing to a previous engagement, it was not possible for him to be present, and conveying his best wishes to the airmen. Admiral Sir Rosslyn Wemyss had sent his congratulations to Capt. Alcock and Lieut. Brown on their splendid achievement. Admiral Sir David Beatty wrote:—"Please give my warmest congratulations to the gallant competitors on their success."

The event which they were celebrating was one of the greatest in the story of human progress, the most romantic of all romances. As an adventure it was simply thrilling; as a feat of engineering it was superb; as a personal effort it placed the men who did it among the heroes of all time; and as a new link between Great Britain and America its value was incalculable. Capt. Alcock said it was a "terrible journey." It must have been a terrible journey, but it was a magnificent flight. It was a flight that would never be forgotten, and that added the names of those two men for ever to the brief list of classic heroes. We might fairly congratulate ourselves on the fact that the pilot who did this was one of our own people. Capt. Alcock was an Englishman, and England was proud of him. Lieut. Brown was, he thought, of English domicile. He understood that he was shortly to make it a more permanent domicile, and they offered him their wishes for happiness and prosperity. This flight was made in a British aeroplane with British engines, and on that they complimented Vickers, Ltd., and Rolls-Royce on the performance of the most perfect and beautiful piece of English machinery. The Rolls-Royce Co., Ltd., bought from the Government, and lent to Vickers, the two engines which performed the journey and the spare engine.

The toast was enthusiastically drunk with musical honours.

The chairman then asked Mr. Churchill to present the prizes, and said that in addition to the £10,000 there was a cheque for £1,000 very generously added by Mr. Laurence Philips for the first Briton to fly the Atlantic—that was Capt. Alcock—and a cheque for 2,000 guineas from the proprietors of the State Express Cigarette to be given to the winner of the *Daily Mail* flight—that was also Capt. Alcock.

Mr. Winston Churchill said:—"The task which has been entrusted to me is a very pleasing one and a very easy one.

"We are met together to celebrate a most wonderful and valiant achievement. It is an achievement which marks the advance of science, and of engineering, and the increasing triumph of men over nature. But it is also an event which shows that, while we have become more powerfully equipped in all that sort of apparatus, we have also preserved as a race the audacity, the courage, the physical qualities of the old heroic bygones times. By this achievement we are able to see, we are able to assure ourselves, that our civilisation has combined the science of the 20th century with the virility and love of adventure of the knights of old. And, let me add, with a modesty and courtesy worthy of ancient tradition, and probably far superior to ancient practice.

"In 1492, Christopher Columbus sailed across the Atlantic and discovered America. I cannot help feeling that this afternoon we are to some extent in contact with and in relation to that event, and that when we welcome our guests we are in the presence of another event of something like the same order as that stupendous event which revealed to Europe and Asia the boundless glories and possibilities of the new world across the Atlantic Ocean. How different were those two voyages in all except two conditions—the peril and the pluck; otherwise the difference presents the most violent contrast that could be imagined, but the pluck and peril are of the same order. In the case of Columbus—the Ambassador is my authority—it occupied 90 days to traverse that immense expanse of water, and our guests to-day have come back across the ocean in less than 16 hours, but into those 16 hours were crammed the concentrated perils which required the same great human qualities as were exhibited in that long, earlier voyage of ancient times.

"And, as I have said, we see from these reflections at once the advance of human powers and methods and the preservation unimpaired of the old deep primitive virtues and energies of mankind. It is more than 400 years since Columbus discovered America; it is only 10 since Bleriot flew the English Channel—it is not so safe and easy as it sounds, or as is often represented, to fly the English Channel. "When one considers all the factors I really do not know what we should admire the most in our guests—their audacity, their determination, their skill, their science, their Vimy-Vickers aeroplane, their Rolls-Royce engines, or their good fortune. All these were necessary, and all of them contributed to their achievements, and to the event which has

brought us all together here this afternoon, to cheer the victors of the first non-stop Atlantic flight. They are the victors. They are the real victors, and they are the only victors. It is no disparagement to the gallantry of Mr. Hawker. It is no disparagement to the brilliantly executed exploits of the United States Navy (Cheers), which, working along service lines, have obtained results of extraordinary value from a service point of view, apart from all other points of view. It is no disparagement to any of these gallant and skilful efforts if we say, in surveying the Atlantic flight made by Alcock and Brown, 'This is it!'

"Its significance in drawing together all the great English-speaking communities that dwell on both sides of the Atlantic is very real and very deep. When we study these prodigious efforts which are being made by so many to traverse the Atlantic by air, to bridge the gulf of waters, to annihilate the space and time which divide these great communities, can we not feel that they also symbolise the attempt to unite, not merely in the sense of eliminating distance, but the attempt to unite into one harmonious association all those great communities of English-speaking free democracies, which, combined together, working in true comprehension and perfect freedom, constitute an absolute guarantee for their own safety and the surest promise of the future advantage and security of the world.

"That powerful factor in our modern social and political life which is usually described as the 'Northcliffe Press,' has in its time championed many causes, and some of them have been very excellent causes, but I venture to think there is no cause which they have more consistently championed and which has been better deserving of their support than the popularisation and the development of the art of flying and the gathering together of a strong public sentiment in favour of great exertions along that path.

"Why should there only be knights of old? Why should there not be knights to-day? These two officers in the War did their duty in a perfectly straightforward manner, suffering wounds, or captivity, as so many of their comrades have done. They would be the first to say that any personal qualities that they may have displayed, or any personal risks that they may have run, are no greater than those qualities which have been displayed and the risks which have been run by scores of their comrades in the flying services. But in addition to all those qualities which are so admirable, and which so many of our flying officers have displayed in the course of their duty, our guests are forever associated with a unique world-famous and joyous event. No one has ever flown the Atlantic in a single bound before, and no one will ever fly the Atlantic for the first time in a single bound again. I am very happy to be able to tell you that I have received his Majesty's gracious assent to an immediate award of the Knight Commandership of the Order of the British Empire to both Capt. Alcock and Lieut. Brown.

"Now it is my duty to present to you, Capt. Alcock, these three cheques—one of £10,000, one of £1,000, and one of £2,100—which constitute and which are your due for having fulfilled the conditions prescribed by those who instituted this most useful and fortunate competition."

Capt. Alcock said:—"Our start, I think, was the most interesting. The people of St. Johns gathered on our aerodrome and wished us a pleasant and safe voyage across the Atlantic. Our aerodrome was rather narrow, and the wind was blowing slightly across. Anyway, we had the help of a good strong breeze, but after getting off we had to fly through a valley, where we got some very nasty bumps from the gusts of the wind, which made it very alarming—to the spectator. Luckily we got to the end of the valley into the uninterrupted air, where we quickly climbed out of the gusts. The weather was very good at the start, but ahead we could see the Newfoundland fog. The sky was also obscured owing to the clouds, which got worse and worse. I think after the first 40 minutes' flight we saw the sky only for about an hour. That was roughly about 3 o'clock in the morning, when we got one or two sights on the stars and on the moon. We got our position, which showed us to be slightly more than half way. Just after that we got into a patch of fog rather thicker than usual and our air speed indicator stuck. We were then at a height of about 4,000 ft., and the machine got into a kind of spiral, and I did not know what was happening. The only thing I could do was to watch my altitude indicator, which I did very carefully. The machine came down very quickly. Fortunately, I saw the sea and was able to correct the machine and get it on an even keel again. About flying upside down—I don't think we actually flew upside down, but I think we were flying at a very steep spiral with probably a little spin, which is really worse, I think, than flying upside down. Towards the end of the flight we came down very

near to the water, probably about 200 ft. high, and we continued at that height until we saw the land. Unfortunately the landing we chose was rather a sticky bog. The machine was damaged, but still we were very pleased with ourselves, as we had got across."

Lieut. Brown emphasised the aid the wind gave them, and thanked the Air Ministry for the meteorological reports. Two methods were open to them: one to make use of directional wireless combined with the compass; the other the method of mariners, with sights of the sun or stars. Directional wireless apparatus was a wonderful thing and, so far as it was developed, was satisfactory, but it had yet to be proved satisfactory for such a long distance as the Atlantic flight. Seamen had for years used the other methods, and it was to these he pinned his faith. The calculations to be made were laborious and difficult in the cramped space of an aeroplane and they were indebted to the Air Ministry for the use of the Baker machine which reduced calculations to a minimum.

Much had been made of the breakdown of their wireless, due to the fact that about an hour after they started the propeller shaft of the generator sheared off. That was partly his own fault. He had been advised against that method of installation by the officers of the Air Ministry. As a regular thing, the generator was so arranged that it could be stopped when not required, but in their hurry they had not fixed the gear for stopping it while in flight. He took the risks of allowing the machine to run all the time, and, unfortunately, his faith was not justified.

Immediately they left Newfoundland they found themselves above fog. It was possible occasionally to see patches of the sea and to obtain their drift from observations on the icebergs, but even these patches soon ceased and they found themselves flying between two layers of cloud. Once, for half an hour, they got a sight on the Polar Star, one of the most faithful friends a navigator could have, and a sight on Vega. These two stars fixed their position south of where he had hoped to be, and it was necessary to alter their course. They had nothing more to guide them until, with great efforts, without straining the engines, Capt. Alcock climbed to 11,000 ft. to let him have an opportunity of finding the sun. At this height it was very cold and the hinges of the *ailerons* froze, so that there was practically no lateral control. At this point his spirit level became useful and he was able to find the elevation of the sun.

He joined with Capt. Alcock in a hearty tribute to the designer of the aeroplane, to the wonderful engines, and also to the efforts of the workmen.

The American Ambassador: "I could not forgive myself, and I trust you will not concur in any failure on my part to express the enthusiastic congratulations of America, and the American people to the brave men who have performed this stupendous feat. And I rejoice in the paternity of one at least of those distinguished gentlemen and I am gratified that, in addition to the Government honours, Great Britain is about to bestow upon him a reward which I am sure he will value even more than they."

"For this is a wonderful moment, and a wonderful achievement, and one whose importance can in no respect be overrated. Where is there in all the history of mankind and of romance a parallel to this constant narrowing of the Atlantic Ocean? To-day a man sleeps one night in America and the next in Great Britain. What is it but the drying up of the Atlantic itself?"

"The meaning and significance of this event, the symbolism I am sure we all recognise, is truly stupendous."

"I ask you to drink with me the health of the chairman and the speedy recovery of Lord Northcliffe."

Mr. Marlowe, in returning thanks, said he was happy to say that the reports of Lord Northcliffe's condition were very good, that he was making satisfactory progress and his medical attendants hoped it would not be long before he was able to resume his normal life.

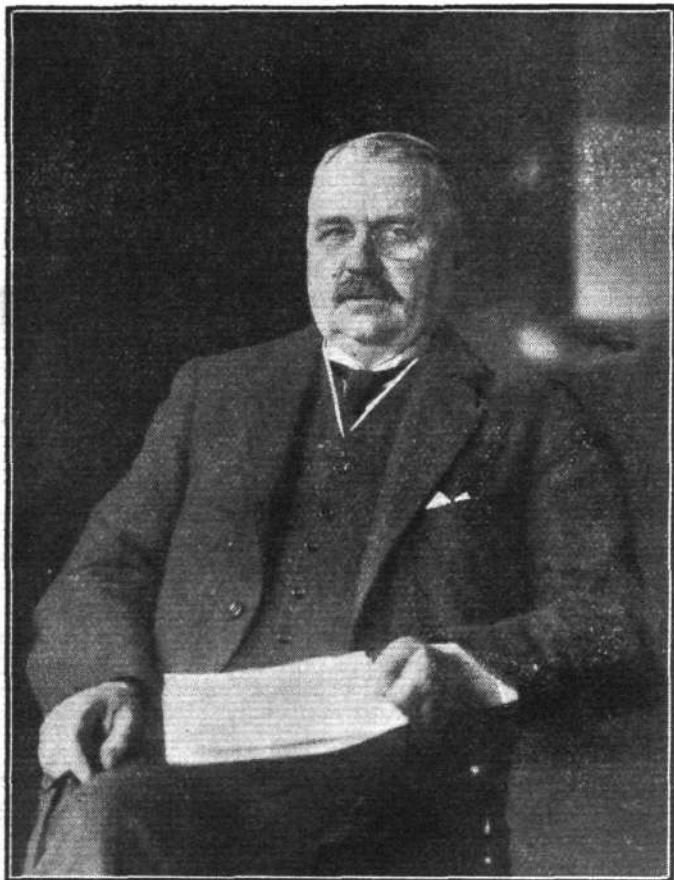
IN an interview with the *Evening News*, Capt. Sir John Alcock said that he had had offers to go to America, but was remaining with Messrs. Vickers as their test and experimental pilot. "We have decided to divide £8,000 between us, and the remaining £2,000 we are giving to the workmen employed on the building of the machine."

Sir John added that their machine was being dismantled in Ireland, and will be brought to England.

Capt. Sir J. Alcock and Lieut. Sir A. Whitten Brown desire to take this opportunity of thanking their friends for their kind congratulations received by telegram, telephone and letter. At the present time they find it quite impossible to acknowledge all these messages personally.



AGAIN the mentality of the Hun has been exemplified in their deed at Scapa Flow. The scuttling of the German Fleet may or may not have been with the cognisance of Berlin. At least one thing which this dramatic ending of the warships has done is the solving of the very difficult problem as to the disposal of the beastly things. From that point of view the world has to thank the parole breakers, and as the Germans themselves seem to be pleased with this settlement, there is little to be said beyond putting the responsible individuals



Lord Inverforth, the Minister of Munitions, who was responsible for the £4,000,000 sale of aeroplane linen last week

upon their trial, adding the value of the fleet to the bill to be paid in gold by the Huns, and either compelling the Germans to clear the hulls from Scapa Flow or provide further cash for the necessary work. There is a comic side to the whole business insomuch as the unconquerable Germans at home are hugging themselves with the flattering conclusion that their Navy was also unconquerable, and had up to the scuttling episode in no way given in, and has now gone down under with all the honours and glory of war. An historical "Der Tag" to be proud of indeed, with a vengeance!

THESE same Huns are still allowed under the final treaty terms to retain until October 1 next a maximum of 100 seaplanes or flying boats for the purpose of searching for mines, all other air navigation material having to be surrendered.

ON the eve of the actual signing of peace, "Fourteen Points" upon the terms, put forward by Sir Percy Scott in a letter to the Press, are, lest we forget, well worthy of record. Sir Percy's summarised comments are as follows:—

"The whole civilised world is, I think, in agreement that the peace terms are fair and equitable; in reviewing them I have no doubt that the whole civilised world will agree on the following points:—

- "1. That the Germans deliberately brought about the war.
- "2. That all the statements made by the Kaiser and his high officials to the effect that the war was forced upon them were lies.

"3. That in the future neither the words nor the signatures of Germans can be trusted.

"4. That as regards the German national character, the War showed that when victorious against Belgium they conducted war on ruthless, remorseless, and relentless principles, and committed every crime that savagery can compass.

"5. That they were encouraged in these crimes by their officers and high officials.

"6. That as liars, from the Kaiser downward, they are unparalleled; they lied to their own nation, they lied to their allies, they lied to the world.

"7. As thieves and wanton destroyers of property they have outdone the savage race of Huns that they are descended from; their wholesale thieving was not the acts of individuals; it was organised and controlled by high officials.

"8. That in defeat their true character is revealed; it is despicable, for they are now squealing like whipped curs.

"9. That the statement made by Hun officials to the effect that they could have carried the War to a victorious end, but that internal trouble forced them to ask for an armistice, is a lie.

"10. That in the War the Huns were fairly and thoroughly beaten on the sea, under the sea, on the land, and in the air.

"11. That the War has practically been a triumph of civilisation over barbarism.

"12. That probably the most contemptible character of the War was the man known as Kaiser William II; he sanctioned the crimes committed by his barbaric subjects, he lied to his Army and to his people; his speeches were mostly blasphemous.

"13. The Kaiser prolonged the War and the consequent shedding of blood for three years, for he knew that he was beaten at the Marne.

"14. When in November, 1918, the end had to come, the Kaiser, instead of facing it like an Emperor and a man, ran away.

"Their last act in sinking the ships at Scapa Flow teaches the world that the Huns have no honour, and that the world has been foolish in treating them as a civilised race; they are barbarians."



"Flight" Copyright

AT THE AERIAL DERBY.—Lieut. Robert Nisbet, the pilot of Martinsyde F 4, whose portrait last week was not procurable, with, on left, Mr. Martin, of the Martinsyde Co.

A GREAT chance for Hun aeroplane souvenirs is open this week. Under arrangement with the Air Ministry six captured German planes have been allotted to Trafalgar Square in support of the Victory Loan. They will be dismantled and given away in parts to those who purchase Victory Loan or

War Savings Certificates. It will be a case of first come first served just as long as the machines last.

GLAD to have corroboration of the intention of the Handley Page pilot and crew to take the air presently from Newfoundland.

R.A.F. P.T. COURSE at Cranwell Lincs.

Capt. Roberts
& Lt. Mason
Winners in B.E.F
competition

Lt
Stewart
Exponent
of the art
of
grace
in Boxing

Sgt
Stollery

Sgt
Gorwood
&
Mascot
Sgt Groves
R.A.F
a boxing
celebrity

Capt Sheriff MC & Major Eletshaw
Commandant

Finale

3rd week

1st week

Arrival

The Progress
of
"Lightning" Smith
from Cologne



"Flight" Copyright.

AT THE AERIAL DERBY.—Mr. Morgan, who was to have navigated Raynham's Martinsyde machine across the Atlantic, but whose sight was injured too seriously to allow him to undertake the crossing, was a spectator at Hendon.

land for a direct trip to Great Britain. As announced some time ago, prize or no prize, the plan of the Handley-Page was to make the trip, just by way of showing how easy and comfortable progress has made the passage *via* the air. The Martinsyde pilot also has, at present, the intention to adhere to the plans as originally laid down. So here's success to both. There's still plenty of enthusiasm ablaze this side to give both crews a hearty good reception upon their arrival.

ALL the same, in spite of the recent success of Capt. Sir J. Alcock and Sir Witten Brown, we fancy the *Montreal Standard*, when announcing the achievement last Sunday week, was just a wee bit optimistic, we venture to think, in predicting that before many years Canadians will be spending week-ends in London, starting Saturday and back on Monday morning.

ACCORDING to our Paris contemporary the *Journal*, the French Aeronautical Department has prepared a series of long-distance flights. As ever, very picturesque and ambitious is the programme put forward to take effect immediately peace is signed. "Our heroic War pilots," states the *Journal*, "will fly over the various European capitals, both far and wide, bearing the tri-colour. The various capitals include London, Madrid, Constantinople, Prague, Warsaw, Vienna, Brussels, Amsterdam, and Cairo (*via* Constantinople). Trips will also be made to Tunis, Algiers, and Dakar (West Africa)."

Of more than passing interest is a concise summary of air-post stamps which appeared the other day in *The Times*. Therein it is stated that special stamps for use in the Transatlantic Air Post have been prepared by the Newfoundland Post Office in two separate types. That for the Handley-Page service consists of the 15 cents (Cabot series) surcharged "Transatlantic Air Post, 1919-\$1," while the Sopwith Martinsyde stamp is the current 3 cents (Caribou Head), the same that was used to frank the letters carried by Hawker and Grieve in their flight.

The historic stamp bearing the imprint "First Transatlantic Air Post, May, 1919," will be eagerly sought after by

stamp collectors, as only 200 specimens exist. The original printing had the date "April" instead of May.

The latest novelty in aerial stamps hails from Tunis, where the 35-cent postage stamp has been converted to aerial use by means of a winged overprint, resembling the badge of the R.A.F. and the words *Poste Aerienne*. Switzerland, too, has utilised the badge of the national Air Corps, a winged propeller, to distinguish the special 50-cent stamp employed in the air post service between Zurich and Lausanne.

Three stamps of the face values 75 cents black, 1 franc blue, and 1f. 25c. red, for use in the French air post, are being prepared by the Government stamp printery on the Boulevard Bruni. The design, by M. Leon Ruffe, shows a portrait of Capt. Guynemer inset above views of the aerodrome at Issy-le-Moulineaux and of an aeroplane flying over the Seine. These stamps will not be issued to the public, but will be affixed by the postal officials to denote supplementary charges for letters carried by aeroplane. Belgium has also a series of aerial postage stamps in course of production.

HAVING regard to the results of the Aerial Derby last Saturday, it is interesting to note the following betting odds quoted as obtainable the day before the race:—

- 2 to 1 against Hawker.
- 4 to 1 against Henderson and Nisbet.
- 9 to 2 against Gathergood, Manton, and Cox.
- 5 to 1 against Prodrer, Draper, and Vaughan.
- 7 to 1 against Saint, Smith, and Turner.
- 12 to 1 against Carr.
- 14 to 1 against Chamberlayne.
- 20 to 1 against Hammersley.

EXCELLENT is the suggestion put forward that a stone tablet should be erected at Clifden on the Galway coast of Ireland, at the spot where the Vickers-Vimy aeroplane achieving the first Transatlantic flight landed. It is suggested that the wing and tail of the machine might be given a permanent place in the museum of Galway University College.



"Flight" Copyright.

AT THE AERIAL DERBY.—The bookies were quite busy in the "paddock."

PROGRESS OF AVIATION IN THE WAR PERIOD*

Some Items of Scientific and Technical Interest

By LEONARD BAIRSTOW, C.B.E., F.R.S., D.Sc.

IT was with great pleasure that the lecturer received an invitation from the Council of the Royal Aeronautical Society to deliver the lecture of 1919 to the memory of Wilbur Wright. Most of us remember the appearance of their aeroplane in Europe about ten years ago and the revolution brought about by their method of lateral control. The effect on European flying was immediate, for the periods of flight began to extend from minutes to hours. I have particular pleasure in adding my tribute to their skill because of the scientific and painstaking way in which they approached the problem of aviation, and successively removed one after another of the outstanding difficulties. Their un hurried attack on a difficult problem contrasts strongly with the present irrational worship of the immediately practical.

They were preceded by another distinguished American Professor Langley, who with equal patience and little reward laid the foundations of aerodynamics on which calculations as to the possibility of flight were first made with any reasonable approach to accuracy. That Langley was correct in his estimates of weight and horse-power has been shown during the War period by the flight of the man-carrying aeroplane which he designed and made. It is true that the original steam-engine was replaced by a modern aero-motor, but the power unit troubled all early workers. Maxim, in a remarkable effort, succeeded in producing a steam-engine in which each horse-power involved a weight of only half a pound, but aviation had to wait for the petrol motor before flight was achieved.

Both Maxim's and Langley's efforts at flight came to an early end. The latter launched a pilotless aeroplane from the top of a houseboat on the Potomac River, but, probably owing to lack of stability, it dived into the water and was wrecked. Maxim endeavoured to avoid the problems of stability by making his aeroplane captive, but the bending of an axle led to disaster when the wings were taking a lift of 10,000 lbs.

It was in their progress from this point that the Wright brothers made history. Their early flight experiments were directed to the development of controls by means of which the *senses* of the pilot were introduced into the mechanics of the aeroplane motion. In their aeroplane it was for the first time possible to raise or lower the nose by elevator, turn to right or left by rudder and maintain an even keel by wing warping. At the present time no other controls are used or appear to be required. Of the three controls mentioned, that of wing warping for maintenance of an even keel had not previously been suggested, and the *ailerons* of modern design are mechanical improvements and not changes of principle. The problems of inherent stability were at that time untouched in practice, although Bryan was then working out the mathematical theory which has now been adopted as the best statement and solution of the problem of the disturbed motion of an aeroplane.

I propose to skip the period 1908-14 and to proceed to some of the relatively highly developed forms of aircraft as they existed at the outbreak of hostilities. At that time a speed of 85 to 90 m.p.h. was considered good, with the possibility of climbing to a height of 10,000 ft. Military training proceeded on the hypothesis that flying for reconnaissance and photography would take place at 3,000 ft., whilst fighting in the air was not adequately provided for.

Two types of aeroplane of the early period will be referred to; both have survived on their merits to the present time, although long since past the standard required on active service. The "Avro" aeroplane has to its credit one of the earliest of the many daring and spectacular feats of our flying men, for it was in aeroplanes of this type that two aviators, now Col. F. Briggs and Major Sippe, flew over the Zeppelin sheds at Friedrichshafen and dropped bombs on their objective. In those days machine guns were extremely rare as part of the equipment of an aeroplane, and the various ingenious devices for firing between the blades of an airscrew making 20 to 30 r.p.s. had not even been contemplated. The horse-power of the engine was 70, as contrasted with the 1,500 h.p. of the largest modern aeroplane flown. In the later periods of the War the "Avro" became the standard elementary training aeroplane, and has an excellent

record of good service. It appears to be peculiarly free from undesirable characteristics.

The second aeroplane which will be referred to as a good early type is the B.E.2C., which has just been declared obsolete. Much controversy has ranged round this aeroplane, perhaps more than any other, and I can imagine mixed feelings amongst members of the audience at hearing it described as a good aeroplane. Probably most of them will agree, however, that its record as a straightforward flying machine is good, and will focus their criticisms on that peculiar feature of the aeroplane which can be best described by saying that it had a strong *will* of its own. The development of the fighting scout has brought out very clearly the pilot's desire for an aeroplane which is wholly obedient to him, even for extraordinary and dangerous manœuvres. Designers have admitted this view, and have done their best to meet it. It is not difficult to see that in aerial fighting a balance must be struck between danger from enemy action and danger inherent to the aeroplane.

The B.E.2C. was deliberately designed to have a will of its own and a desire to stay right side up. The late Mr. Busk spent much of his energy in producing this effect, and I believe that General Seely took the aeroplane from Farnborough to Salisbury Plain without using any other control than the rudder. It was strong and for those days reasonably fast, whilst fighting in the air had not begun to show prominently that its excessive stability was a defect. I want to make it quite clear at this point that, on the other hand, instability is not a desirable characteristic in any aeroplane, and certainly not for civil uses; instability leads to accidents. The B.E.2C. was unpopular because it was too stable, and called for considerable muscular effort in the rapidly recurring emergencies of a fight with a mortal enemy. It is now obsolete mainly because of the insufficiency of its engine power to meet modern needs.

Scientifically and technically the B.E.2C. is one of the most interesting aeroplanes ever built. It showed conclusively that the line of argument developed mathematically by Bryan could be used to calculate the degree of stability of an aeroplane, and so paved the way for the design of aeroplanes with the desired characteristics of indifference or stability as required for fighting or bombing. It showed that the will of an aeroplane is not a fortuitous characteristic, but is one of those quantities over which the designer has a large measure of control.

Stability and instability in an aeroplane are easily measured, and at Martlesham Heath a camera has been designed and used to produce records, some of which I propose to show you at a later stage. It appears that many of our aeroplanes are stable.

The B.E.2C. had an engine of 90 h.p., carried pilot and passenger, and reached a top speed of over 85 m.p.h. On these points it may be contrasted with the Bristol Fighter, which took one of the favourite places in the later phases of aerial fighting. The engine power was 275 and the top speed over 110 m.p.h. at 10,000 ft., whilst it was able to climb to nearly 20,000 ft. Using such aeroplanes our fighting pilots waited for considerable periods of time at heights of 15,000 ft. ready to swoop on an enemy seen at a lower level. With the barometer at 17 ins. and the thermometer showing 60 degrees of frost, prolonged effort was no small call on their physical and mental powers. Fitted with two guns firing through the airscrew and a third gun which could be trained in any direction by an observer, this aeroplane was a formidable antagonist.

The usual fighting scout was, however, a single-seater with its two fixed guns firing through the airscrew and trained by the motion of the aeroplane. Speeds up to 130 m.p.h. have been reached and the ceiling pushed up to 25,000 ft. This increase of speed and ceiling are accounted for chiefly by the fact that it has been found possible to instal an engine of 210 h.p. in an aeroplane weighing less than 2,000 lbs., a figure which means 1 h.p. for each 10 lbs. of load carried.

The large aeroplane, as we now know it, had no representative until the middle period of the War, when the first large type of Handley Page aeroplane began to operate from Dunkirk. With a total weight of 11,000 lbs. and a horse-power of 550, the aeroplane will be seen to compare on weight per horse-power with the "Avro" and B.E.2C.,

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and has a very similar top speed and ceiling. Another large aeroplane, the D.H.10, compares more closely with the Bristol Fighter class, and develops a high speed and ceiling.

The question arises: Is there any difference of principle involved in passing from the small aeroplane of 25 feet span to the latest Handley Page of 130 feet span? The subject will be touched on lightly before passing to one or two important items in the economics of flight.

Rough Prediction of Aeroplane Performance

The lecturer then showed a set of curves indicating how the speed of flight near the ground and at 10,000 ft. depends on the nominal power of the engine and the gross weight of the aeroplane. It is the ratio of horse-power to weight which is used, and there is sound theoretical reason for this choice. Regarded as an empirical curve, however, it is found that the performances of the smallest and largest aeroplanes are equally well predicted. Like all generalisations, it has its limitations, and a designer who has given special attention to one type will be able to give a closer prediction. On the other hand, any record of performance showing striking departure from the curve may be regarded with distrust.

Model to Full Scale

Not only may the curve be applied over the aeroplane range, but also to the larger models tested in a wind channel. It will shortly be possible in one of the wind channels of the National Physical Laboratory to test models so large that the lift will be 200 lbs. and on which the complex effects of the airscrew slipstream can be represented. Without waiting for this new step forward, it is already clear that carefully conducted experiments on a complete model aeroplane form the best known guide to new design. I believe that I am correct in saying that both the designs of large aeroplanes by Messrs. Handley Page were specifically based on complete models; the records of the testing institutions show many other instances.

The most direct experimental evidence of the agreement between model and full scale has been provided by a comparison of the pressure distribution on the upper and lower wings of a biplane. The flight experiments were made at Farnborough by the Royal Aircraft Establishment and the model tests at Teddington. As three of the four surfaces agree within the limits of error of observation on the full scale, the curves show no measurable scale effect. The relation of model to full scale was thought to be of sufficient importance to warrant the appointment of a special committee, and its findings are now reproduced:—

"Careful consideration of all the available information leads to the following conclusions:—

"(i) For the purpose of biplane design model aerofoils must be tested as biplanes, and for monoplane design as monoplanes. The more closely the model wing tested represents that used on the full-scale machine, the more reliable will the results be. So long as the differences mentioned in paragraph 7 remain unexplained, no high accuracy can be obtained in the prediction or verification of performance at low lift coefficients.

"(ii) Due allowance must be made for scale effect on parts where it is known. In the case of struts, wires, etc., the scale effect is known to be large, but these parts can be tested under conditions corresponding with those which obtain on the full-scale machine.

"(iii) The resistances of the various parts taken separately may be added together to give the resistance of the complete aeroplane with good accuracy, provided the parts (e.g., the undercarriage), which consist of a number of separate small pieces, are tested as a complete unit.

"(iv) Model tests form an important and valuable guide in aeroplane design. When employed for the determination of absolute values of resistance, they must be used with discrimination and a full realisation of the modifications which may arise owing to interference and scale effect.

"In forecasting the performance of a machine of a known type, methods can be employed other than the addition of the resistance of all elementary component parts. Every designer has at his disposal the full-scale test results of a certain number of types of aeroplanes, and where a new design conforms to any one of these types the most satisfactory point of departure for improvement in design is probably given by these test results. For suggestion as to how improvements can be made the designer is still dependent on model tests.

"It is of great importance that such information should be increased, and its use extended by further systematic full-scale research."

Economics of Flight

It has been mentioned that the speed of aeroplanes has increased from 85 m.p.h. to 130 m.p.h. in five years, and some

further improvement may be expected in the future. No equal addition to the speed range is probable, and economy suggests a reduction. It is not possible to give a single estimate of whether it pays to fly fast in civil aviation, but for fighting it is the last reserve of superiority which is all important. In the commercial sphere, where time is money, the choice between speed and cost of running depends on how often a man's time is worth more than £10 an hour, or some such figure, and whether the aeroplane can save any of that time for him. Along the grand trunk routes railway traffic is fast, and the demand for the urgent delivery of light goods does not promise immediate support for the aeroplane carrier. For cross-country journeys, and in particular across water, saving of time by the use of aircraft becomes marked, and there appears no reason to doubt that aeronautics, like wireless telegraphy, will find its place in the world's traffic by adding to the possibilities of life and not by any considerable displacement of existing facilities. In some respects it is unfortunate that the War has produced a vigorous industry without the usual concurrent growth of civil demand and without even a clear indication of the correct road along which development should proceed.

A slide was then shown which illustrated the aerodynamic disadvantages of high speed. It is to be noted that a gross weight of 1,000 lbs. can be carried by an aeroplane of modern type for an expenditure of 25 h.p., but there is no reserve, and the pilot could not climb or cope with down currents. His speed would be about 55 m.p.h. The necessary horse-power for the same load could be reduced by providing bigger wings and flying slower, and it has been pointed out by various writers that the most economical design aerodynamically requires speeds of flight below those of commercial utility.

From the curves it was seen that the aerodynamic quality of the aeroplanes at the beginning of the War was not appreciably less than those of the present day, for all give performances indicated by the curve. Progress has followed the development of the aeromotor, which now permits the use of 1 h.p. for each 8 lbs. of gross weight, whereas in 1914 the same power was yoked to a load of nearly 25 lbs. The most recent of our large aeroplanes carries nearly 20 lbs. per horse-power, and its performance on speed and ceiling is not greatly different to that of the "Avro" or B.E.2C. It is now accepted as a fundamental truth that the weight-carrying aeroplane cannot be the fast aeroplane, and the rate at which the horse-power curve is rising shows that the conditions become progressively worse. It needs little imagination to see that increase of top speed beyond present limits will not easily be attained, and that no great increase such as that during the War period is within the limits of reasonable expectation.

A table is given below which is instructive in the economics of aeroplane carriage. The figures are round numbers advisedly to emphasise the fundamental nature of the problem as well as to avoid any undue sense of precision in the calculation. Flight is supposed to take place at about 1,000 ft. and the engine to be doing its best. The first column shows the speed of flight, the second the gross weight which can be carried per horse-power, and the third column the percentage of gross weight available for passengers and merchandise for a journey of 500 miles:—

| Speed of Flight, m.p.h. | Gross Weight, lbs. per h.p. | Percentage of Gross weight available for Passengers and Merchandise. |
|-------------------------|-----------------------------|--|
| 60 | 38 | 45 |
| 70 | 35 | 44 |
| 80 | 28 | 41 |
| 90 | 21 | 38 |
| 100 | 17 | 33 |
| 110 | 13 | 27 |
| 120 | 10 | 20 |
| 130 | 8 | 10 |

It will be seen that the choice lies between a time of six hours and a useful load of 40 per cent. of the total and a time of four hours and 20 per cent. of load useful. Only the particular need of the moment can determine a final choice.

This disadvantageous law of speed can be modified to a small extent by design, and the final result is typical of the ordinary engineering compromise. One of the changes of design contemplated involves an increase of landing speed, but until forced landings become very infrequent so that a prepared ground can always be relied upon, it is difficult to imagine any substantial increase on the usual landing speed of 40 to 45 m.p.h.

An appreciable aerodynamic advantage arises from flying high. If V be the best flying speed, V_l the stalling speed,

the relative density, $(kL)_{max}$ the maximum lift coefficient, and $(kL)_{max}L/D$ the lift coefficient of an aeroplane at maximum lift to drag, then

$$\sigma \frac{1}{2} V = VL \sqrt{\frac{(kL)_{max}}{(kL)_{max} L/D}} \quad (1)$$

$\sigma \frac{1}{2} V$ is the well known quantity called "indicated airspeed." The formula shows that the original design of an aeroplane—which fixes the right-hand side of equation (1)—does not fix the most economical speed, but only its airspeed. It is a further fundamental theorem in aerodynamics that the resistance of an aeroplane is the same at all heights for the same indicated airspeed, and as a consequence the work done and fuel consumed on a journey of, say, 500 miles is the same at all heights. On the other hand, the earth speed for a constant indicated airspeed increases with height in the ratio of 1.16 : 1 at 10,000 ft. and 1.37 : 1 at 20,000 ft., and a saving of time results from high flying. The weight of engine would rise somewhat, since the power required increases in the same ratio as the earth speed, but the modification of conclusion is not serious.

Engine Weight and Supercharging

When saying that an engine weighs 2 or 3 lbs. per horse-power, it is common practice to use the maximum horse-power the engine can give continuously. In designs as they now exist this maximum power is usually developed at ground level. The power developed during high flying is less than this maximum, and, in fact, is about half of it at 15,000 ft., where the weight per horse-power is 4 to 6 lbs. Attention has been drawn to methods of keeping up the power of the engine, and two main lines of progress show promise. In one of these the design is based on high altitude conditions, and the full development at the ground prevented; in the other a blower is provided which increases the air taken into the cylinder at high altitudes. The exhaust turbine, developed by Rateau for this express purpose, has now reached an advanced stage of development. The weight of the blower and the power necessary to drive it must be offset against the increased power due to greater charges, and although an important reduction of engine weight below 6 lbs. per horse-power at 15,000 ft. may be expected, the limit will always be above that quoted for ground level.

Airscrews

The consideration of airscrew design for supercharged engines brings into prominence a very useful but somewhat accidental balance between the output of power of a non-supercharged engine and the power required to drive the airscrew. Some of the important stresses in an engine arise from centrifugal forces, and for this and other reasons a limit is put by makers to the maximum permissible speed of rotation of the crankshaft. The combination of aeroplane, airscrew and engine with which we are best acquainted goes a very long way towards a natural arrangement for the prevention of excessive speed. The balance is very seriously disturbed if a supercharged engine, which maintains constant horse-power from the ground to 15,000 ft., is used. An idea of the magnitude of the change of speed can be obtained from a simple formula which says that the horse-power for flight in the neighbourhood of normal top speeds varies as ρV^3 . For constant power it will then be seen that the aeroplane speed and airscrew revolutions will be $\sqrt[3]{2}$ times as great at 15,000 ft. as at the ground. This is an increase of 26 per cent., or from 1,400 to 1,760 r.p.m., and would be many times the excess allowed for good running. It will be noticed that the effect of supercharging an engine is to convert a small loss of speed with height into an appreciable gain.

In order to deal successfully with the supercharged engine when it arrives, it will be necessary to abandon fixed airscrew blades and to have a device which admits of the adjustment of pitch during flight. In civil aviation there will be time for the operation by hand of the necessary mechanism. Satisfactory methods of holding wood blades in metal sockets have been developed, and it is not improbable that the work of operating the variable pitch mechanism can be thrown on to the engine. There appears to be every reason to think that the difficulties are well within the reach of engineers, and will be overcome whenever the demand becomes sufficiently insistent.

A discussion of some importance has been raised by the conflicting requirements of airscrew designers and engine makers. It is apparent from the trend of engine design that crankshaft speeds of 2,500 r.p.m. are contemplated in order to reduce weight per horse-power. On the other side, the airscrew designer finds a loss of efficiency of the airscrew which becomes serious at high speeds, and much greater than

any gearing losses in the engine. The position may be accepted as well grounded, and it was necessary to discuss the relative value of numbers as represented by the simplification of an ungeared engine and quality as represented by high performance. If, for civil flying, it may be anticipated that the engine unit will have a horse-power of about 400, the gearing for a "tramp" aeroplane should bring the airscrew revolutions down to 1,000 or 1,200 r.p.m. If necessary four-bladed airscrews can now be used, and the slow rotation and large diameter will not only tend to high efficiency, but probably also to quieter running.

The use of ungeared engines and large powers was bringing a new feature into airscrew design. Tip speeds of 600 ft. per sec. are not uncommon even with gearing, and airscrews have been used with tip speeds in excess of 850 ft. sec. On theoretical grounds it was anticipated that changes in the type of air flow from an airscrew would begin to appear at about 500 ft. sec., or roughly half the velocity of sound in air. These changes were affecting design, and experience factors of increasing magnitude were being introduced to meet the new conditions of operation of airscrews.

The importance of the subject was becoming very great in the closing period of the War, and a special design was made at the Royal Aircraft Establishment which could be rotated on a spinning tower at speeds up to nearly 1,200 ft. sec. The results obtained were very striking, the simplest of observations sufficing to indicate a great departure from the type of flow on which normal airscrew design is based. Standing in the rear of the airscrew, the usual strong breeze was felt at speeds below 900 ft. sec., but disappeared before the top speed of 1,160 ft. sec. was reached, leaving a region of comparative calm. The change was noticed more readily on shutting down, owing to the suddenness with which the slipstream made its reappearance. The phenomenon was more closely investigated, and it was found that the new type of flow was largely centrifugal, whereas the normal flow resembles that of a jet of rather less diameter than the airscrew. There was no sudden increase in the rate of variation of power with speed, but considerations of momentum suggest that almost the whole of the thrust had disappeared. As an organ of propulsion, the airscrew was probably very inefficient, whilst the noise produced was a source of extreme discomfort.

An experiment in flight with an airscrew having a tip speed above the velocity of sound has been contemplated, and this is one of the cases in which flight on an aeroplane presents the only available means of progress. It will be a difficult experiment, but is accepted by the experimental pilots because of its value. I should like to add my personal tribute to the courage and skill of the members of the Experimental Staff and Flying Squadron at the Royal Aircraft Establishment. In one instance in particular loss of life occurred in a very direct attempt to assist in urgent design. An accident, of which the cause was particularly obscure, had occurred, and an investigation was being made. The Royal Aircraft Establishment was approached for assistance, and completed a valuable report. When the last records were being taken the aeroplane came to grief by a repetition of the accident which they were investigating. Both pilot and observer lost their lives. Although this is, perhaps, the most striking example, it is not alone in showing the call which aviation has made on men, not all of whom had served in a theatre of war.

Factors of Safety

I am not going to deal with the calculations made when estimating the load which an aeroplane can safely bear, but to draw attention to the loads which may come on it due to its motion through the air. A further difference between military and civil flying is shown in the process, and it will be seen that the fighting pilot carried out his work under exciting conditions, during which his aeroplane was subjected to severe strain, and in which his physical sensations must have added considerably to those due to the presence of an enemy. Needless to say the records shown were taken in a "mock fight," and require extension by the use of some little imagination before they are taken as representative of those in a "real fight."

The forces on an aeroplane can be measured by a delicate little instrument called an "accelerometer." Although it has a good scientific name, it has also the merit of being a very prosaic instrument, which measures the heaviness with which a pilot sits on his seat. Ducking the nose of the aeroplane tends to throw the aviator out, and at the moment at which he loses his seat the instrument reads zero. During a loop it may indicate that instead of a real weight of 10 stone, the pilot's apparent weight is 40 stone. His head

is then very heavy on his shoulders, and on the one occasion on which I experienced the sensation my head was distinctly unstable, and an incautious movement brought it forward "out of control."

The first record occupied nearly half an hour in the taking, of which about 20 minutes was in the air. The instrument, designed by Dr. Searle, F.R.S., of the Royal Aircraft Establishment, was strapped to the knee of an observer, and at intervals the pilot interposed some of the trick evolutions of flying on the more normal course of the flight. The first clear deduction from the record is the uneventfulness of straight flying, especially at good heights. This is shown by the tendency of the black line to keep about the value 1, so that the pilot and passenger have their usual weight. Flying low down it will be noticed that the changes called "bumps" sometimes reduce a pilot's apparent weight to half its ordinary value, and at other times increase it to nearly one and a-half times. The sensations are very like those experienced on a switchback or mountain railway, and in a well-shielded cockpit this is the only noticeable effect of motion on the sense of feel. The earth, however, becomes far less impressive as the representative of solidity, and has its attributes transferred to the aeroplane. So much is this the case, that in a loop it is the earth which goes over your head, whilst in a banked S turn the waves of a high sea are less wonderful than the swaying of the earth. These impressions are very real, and have a rational basis. We are so accustomed to living on the earth and to the use of such instruments as levels, that it needs a definite effort to realise that on an aeroplane a level does not indicate the horizontal. On the contrary, a level will consistently say horizontal when the aeroplane is banked to 45 degrees or more, and not only does the level say this, but the pilot's sensations of feel tell him he is sitting upright. In the absence of side-slipping the local level is given by the wings of an aeroplane. With a horizon visible a pilot can keep level relative to the earth by the use of his eyes, but this power is removed by immersion in a cloud. By the use of instruments of a not very intricate nature straight flying can be conducted in a cloud, and fog is not by any means an insuperable bar to aerial navigation.

Leaving the record of ordinary flight and coming to the "stunts," it will be found that on two occasions the pilot was in danger of leaving his seat, and the importance of a belt will be appreciated. Looping and spinning produce heaviness on the whole, the extreme value being nearly three times the normal. A rapid turn almost always increases the apparent weight, and in a mock fight it is very noticeable that the greater number of manœuvres seat the pilot more solidly, and therefore help in the accurate control of the aeroplane's motion. In a few instances and for a few seconds the apparent weight is zero, whilst the extreme in the other direction is as great as four times the normal.

Periods of high stress do not last long, but the air forces have been fully transmitted through the structure, which is then liable in fighting to be loaded to four or five times that in level flight. Although the conditions of fighting are very exacting, the demand for adequate structural strength has been met with considerable success. It would, therefore, appear that for civil transport structural design is far advanced towards complete safety.

Controls

Reference was made earlier in the evening to the pilot's wish to have an aeroplane wholly subordinate to his will, even at the risk of danger to himself. Control is difficult to define in numerical form, especially as the manœuvres are rapid; it takes only a few seconds to get from a level keel to a vertical bank, and the pilot is far too busy to observe a stopwatch. At the Royal Aircraft Establishment the idea was formed and developed of photographing one aeroplane from another. The cinema camera used was carried on one aeroplane, which flew steadily along a straight level path; the film was driven by a small windmill. Directed towards a second aeroplane flying behind, any motion, such as turning, rolling or looping, could be photographed. The latest stage of the experiment is to use simultaneously a number of instruments bearing the undignified title of "Rats," which record the movements of the controls during the manœuvre. The scheme will only be outlined this evening, as a full description will shortly be given by the Royal Aircraft Establishment. The work of reduction proved to be analytically difficult, and has been circumvented by the use of a globe, on which the solutions of spherical geometry present no difficulties. Given such a method of investigation it would be possible, even in a fighting scout, to assess the merits of any particular control in a definite numerical statement,

and so lay the foundation for the final design of the best systems.

Relay Control for Large Aeroplanes

With the exception of a few flying boats, the control of all heavier-than-air craft has been by column or wheel and rudder-bar connected by cables to the elevator, *ailerons* and rudder. This is a partial relay, as the couples which move the aeroplane come from the air and are far greater than those exercised by the pilot's muscles. An aeroplane of a given size may be light or heavy on its controls, and those designs in which the control is light are greatly appreciated. Forces on a pilot's hand of 1 to 3 lbs. are described as light, 5 to 10 lbs. acceptable, and 30 to 40 lbs. heavy. Bigger forces can be taken through the legs from the rudder bar. The largest manually-controlled aeroplane weighs twenty times as much as the smallest, and other things being equal this would represent the increase in pilot's effort. A small aeroplane with light control may represent a heavy type of large aeroplane. Some relief can be obtained by the use of an adjustable tail plane, but this is too slow for such operations as landing. In meeting the new problems involved in the control of large aeroplanes, balanced surfaces were introduced, and have sufficed to bridge the present range of size, at any rate for those large aeroplanes which have sufficient stability to fly themselves for the greater part of their time in the air. It might be thought that no limit existed to the possibilities of balancing, but it is found that the conditions required are not the same at all speeds of flight. It is important that the controls shall not "take charge" due to overbalance, and so a small reserve of stability of the control surface is necessary. A more important, but less obvious, limitation arises from the fact that the atmosphere is gusty, either naturally or because of the airscrews. This gustiness upsets all hope of accurate balance, as the irregular forces on the pilot's limbs lead to discomfort. Some appreciable degree of stability in the controls is thus indicated, and as a corollary it is necessary to look to new ideas. The most promising development is one which assists the pilot in the same way as the steering engine of a ship assists the helmsman. The stage of finality is still distant, but one control has been developed and used for seaplanes which relieves the pilot of three-quarters of the effort required to move the *ailerons*.

Stability

The relay control just mentioned only assists the pilot, and does not remove the necessity for his constant attention. The human being is a complex mechanism on to which aeronautics throws all its outstanding difficulties, and although the opinion is probably heretical, I believe that pilots are not anxious to do unnecessary work. At any rate, one of them had the normal human characteristic and fixed a plate in the wind which was to operate the relay control when one wing went down and side-slipping began. He discovered a natural period of the aeroplane. Every 6 secs. down came the right wing, the control put over the *ailerons* and brought it up as expected, but overshot the mark, so that hunting occurred until the pilot intervened. It is probable that that natural period had never been suspected, just as early aeroplanes were thought to be free from phugoid oscillations.

These natural periods are indicators of stability, and every aeroplane has its own characteristics. Many records are now available from the Royal Aircraft Establishment and some from Martlesham Heath. In a lecture to this Society some years ago I had the pleasure of exhibiting a number of small models made to illustrate the mathematical theory of stability. Most of the examples to-night are taken from flight records, and as such are devoid of any theory. It is, perhaps, necessary to say this clearly, otherwise the distinction might be missed in the exactness of the agreement.

Two pieces of apparatus, one a simple block of wood, will draw attention to the mechanical ideas which in aviation constitute the basis of stability. Every one knows that a top-heavy body falls over. An aeroplane may have a property exactly analogous to top-heaviness and a tendency to turn over on its back. The wooden block stands steadily on the table until disturbed, when it oscillates and gradually settles back to its initial state. This is one of the noticeable characteristics of the motion of a stable aeroplane. The other way up, the block is stable against a small blow, but is upset by a larger one, and is typical of a limited range of stability. All these motions are familiar. A fourth type is far less common, and the model used to illustrate it is correspondingly uncommon. If I spin the gyro and set the apparatus in a vertical position, it will oscillate slowly, the amplitude getting greater and greater until the apparatus falls over. This is the condition known to engineers as

"hunting." I propose to show a record taken on an aeroplane which hunted.

Stable Aeroplane

The lecturer then showed a speed record reproduced from an automatic apparatus attached to an aeroplane. A special clutch was provided by means of which the control column could be locked; the record begins with the aeroplane flying at 62 m.p.h. and the lock just put into operation. As the steady speed was then 73 m.p.h., the aeroplane, being stable, commenced to dive and gain speed. Overshooting the mark it passes to 83 m.p.h. before again turning upwards; there is a very obvious dying down of the oscillation, and in a few minutes the motion would have become steady. The record shows that after a big bump the aeroplane controlled itself for more than two miles without any sign of danger.

Unstable Aeroplane

The next record shown was very different and not so easily obtained, since no pilot cares to let an unstable aeroplane attend to itself. No lock was provided, but by gently nursing the motion it was found possible to get to a steady flying speed with the control column against a stop. Once there the pilot held it as long as he cared to, and the clock said that this was less than a minute. After a few seconds the nose of the aeroplane began to go up, loss of speed resulted and stalling occurred. Dropping its nose rapidly the aeroplane began to gather speed and get into a vertical dive, but at 80 m.p.h. the pilot again took control and resumed ordinary flight. The aeroplane in this condition is top-heavy.

Further Records

As an aeroplane may be flown at different speeds, it is necessary to examine the effect of speed on stability, and the next record shows good stability for a modern aeroplane at speeds of 83 to 111 m.p.h. and for conditions more onerous than those of a locked control column. The records were taken by the equivalent of a pinhole camera carried by the aeroplane and directed towards the sun. The pilot started the record by putting the nose of the aeroplane down and then abandoning the control column. Big oscillations were produced, which died down with considerable rapidity. All records show marked damping, and without measurement it is difficult to detect any effect of speed. In the next record, which is uncommonly interesting, the effect of speed is



The Aeroplane Linen Deal

WHAT is believed to be the largest one-man deal since the Armistice was announced on June 19, when it was stated that the Aircraft Disposal Department had sold to Mr. L. J. Martin 40,000,000 yards of finest quality linen made for aeroplane coverings; the price stated to be about £4,000,000. The linen ranges over sixteen varieties in widths varying from 25 to 72 inches. Mr. Martin has stated that he will sell as much of the linen as possible to the British public, and that the remainder will be sold to the Allies and in neutral markets. We refer to this matter further on page 830.

Jacques Schneider Maritime Cup

As announced in FLIGHT recently, the next race for the Jacques Schneider Maritime Cup will be held in England early in September next, the exact date and place to be announced later. In 1914, the winner was C. H. Pixton on a Sopwith seaplane, the nominee of the Royal Aero Club, representing the British Empire.

The race will be over a distance of 200 nautical miles, exclusively at sea, in a closed circuit having a minimum course of five nautical miles, and situated outside any port or enclosed harbour. At least two alightings must be made on the water at points fixed by the officials.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and reserves to itself the right to hold eliminating trials.

Entries are to be made at the Royal Aero Club, 3, Clifford Street, London, W. 1, not later than July 31, 1919. Each entry must be accompanied by the entry fee of £20.

R.A.F. Relinquishing Leysdown Aerodrome

THE Air Ministry announces that Leysdown Aerodrome will shortly be vacated by the R.A.F.

An Amballa to Simla Flight

THE further details which are now to hand regarding the flight of Maj. H. A. Tweedie, Aus. F.C., from Amballa to Simla provide a remarkable tribute to the stability of the British aeroplane against heavy dust and thunder-storms. When Maj. Tweedie, flying a Sopwith Camel, left Amballa for Simla, visibility was so poor that at a height of only 6,000 ft. it was

obvious. The upper diagram shows that at a speed of 100 m.p.h. and a height of 10,000 ft. the aeroplane is satisfactorily stable. During the period "a" the pilot did his best to fly level, whilst for "c" the aeroplane was left to its own devices and proved to be a good competitor to the pilot. At the end of "c" the pilot resumed control, put the nose down and abandoned the column to get the oscillation diagram which gives a measure of the stability. At a speed of 90 m.p.h. at 1,000 ft. the oscillation died down a little for the first few periods and then became steady. The stability in this condition was very small indeed, and a reduction of speed to 70 m.p.h. was sufficient to produce hunting. Two records are shown, the more rapidly increasing oscillation being associated with climbing.

The oscillations so observed are calculable, and the effect of gusts in a natural wind are readily deduced from the oscillations observed in still air. It is to be hoped that the stability of the aeroplane will now receive the attention which has in the past been devoted to performance, and has led to a British literature unparalleled in any other country of the world. It is easy to make an unstable aeroplane; it is not difficult to make a very stable aeroplane. On the other hand, it needs considerable care to give an aeroplane a desired degree of stability. It is to be hoped that we have for ever ceased to regard stability with indifference, or as an undesirable quality which tends to diminish the skill required of a pilot.

Once it is conceded in the necessary official quarters that the study of stability is important, there will be no difficulty in beginning the progressive collection of data; but if this work is to proceed satisfactorily it is necessary that an appreciable part of the time of the staff of the National Physical Laboratory and the Royal Aircraft Establishment shall be continuously devoted to it. Incomparably more laborious than that relating to performance, it is work which can only be broken into at frequent intervals at a cost of serious loss of time and accuracy, and in the days to come, when the number of aeronautical engineers with mathematical knowledge is sufficient for the needs of the industry, this data will be the fundamental stock-in-trade. The immediate needs of the industry have much support, but a policy of looking two or three years ahead has fewer advocates, in spite of the fact that such provision is necessary if Britain is to keep her lead in the air.



impossible to see a spot five miles distant; more extraordinary still, no hills were visible. Flying by compass, Maj. Tweedie bore north-east into the clouds at 7,500 ft., and again climbing failed to get above the clouds. He then made up his mind that it was practically useless to carry on, but looking around he found nothing could be seen; a dense fog and ominous indications of a severe dust-storm were creeping up behind. Climbing still higher, Maj. Tweedie observed that the storm was getting nearer and nearer. He says he could not make up his mind which would reach Simla first. Hoping against hope that he could race the storm he climbed his machine to 10,000 ft., and was relieved to see the Simla hill in front of him. In order to approach the aerodrome, it was necessary to come down into a cup of the hills. The moment he throttled down, however, the machine became unmanageable owing to the bumps due to the thunder-storm overhead. Eventually, compelled to approach the ground "down wind" owing to the storm, he was lucky enough to make the dangerous approach of about 300 ft. deep and only accessible from one end. Jumping a wall between trees 15 ft. higher the pilot made the landing just as the storm broke. So severe was it that within a quarter of an hour there were over 20 holes in the fabric of the planes caused by hail-stones larger than pigeons' eggs.

The arrival of the machine at Simla created a great impression, particularly amongst the natives, who saw an aeroplane for the first time.

Transatlantic Flight Items

A TRIAL lasting 1 hour 20 minutes was carried out with the Handley Page machine at St. John's on June 10, while another flight of an hour's duration was made on June 19. In each case it was reported that everything worked satisfactorily.

A message from St. John's on June 18 stated that Maj. ffiske of Messrs. Boulton and Paul had received word that the two Boulton and Paul entries had been withdrawn from the Transatlantic flight.

This will not affect the plans of the Martinsyde and Handley Page crews who are preparing to start at the first favourable opportunity.

The American flying boat NC 4 is being sent back to the U.S. on the "Aroostook."

Personals.

Casualties.

Lieut. JOHN HOLICK, R.A.F., who was officially reported missing and now presumed killed in action on May 18, 1918, at the age of 19, was the only son of Mr. and Mrs. Thomas Drake Holick, Little Gaynes, Upminster, Essex.

Capt. ELGIE B. B. JEFFERSON, 1st The King's (Liverpool) Regt., and R.A.F. who was killed on May 15 while carrying aerial dispatches to Paris, was the only son of Mr. and Mrs. Jefferson, of "Ballahott," Isle of Man.

Lieut. NEIL M'EACHRAN, 59th Squadron R.A.F., who was killed instantaneously in a flying accident at Duren on May 20, at the age of 24, was the eldest son of Mr. and Mrs. Neil A. L. M'Eachran, Homelands, Thorntonhall, Lanarkshire.

Capt. ROLAND PITT FENN, Croix de Guerre, R.F.C., 18th Squadron (formerly S.Q.M.S., Surrey Yeomanry), who was reported missing on March 25, 1918, and is now officially presumed killed on that date, was the only son of the late William George Fenn, of Croydon, and Mrs. Fenn, Warlingham.

Sec. Lieut. HUBERT W. RANSOM, R.F.C., who was officially reported missing and now presumed killed in action on March 27, 1918, was the third son of Mr. and Mrs. Francis Ransom, of "The Chilterns," Hitchin, Herts.

Capt. HOWARD NAPIER WALKER, O.B.E., M.C., 2nd Welsh Regt., acting Lieut.-Col. R.A.F., who died on June 3 at the R.A.F. Central Hospital, Finchley, from the effects of wounds received in action in 1914, was the eldest son of Charles Low Walker, Hopewell, Walkers Wood, Jamaica, and of Mrs. Walker, Home Lodge, Plymouth.

Capt. ERIC WATERLOW, Flt. Comdr., M.C., D.F.C., mentioned, 25th Squadron, R.A.F., previously reported missing on July 16, 1918, now officially presumed died on or after that date, was the son of Herbert and Marian Waterlow, of 154, Gloucester Terrace, Hyde Park, W. 2.

Married

Capt. RUPERT FORBES-BENTLEY, D.S.C., R.A.F., of Masslands, Beckley, Sussex, was married on June 7 at St. Bartholomew The Great, Smithfield, E.C., to RUTH HARRIETT, elder daughter of Charles BRISTOW, Bank House, King's Lynn.

Capt. RAYMOND VICTOR KANN, R.A.F., was married on June 19, at St. Saviour's, Hampstead, to DOROTHY, youngest daughter of Mr. and Mrs. P. LOVE, of 96, Adelaide Road, Hampstead.

Capt. ALAN FREDERIC KEMP, late R.A.F., of 80, Oxford Gardens, W., was married on June 21 at Christ Church, Lancaster Gate, to MADELEINE BENSON, widow of Lieut. R. C. Benson, R.F.C., and elder daughter of Mr. and Mrs. Geo. ASHBY, of The Lodge, Harmondsworth, Middlesex.

Capt. ATHELSTAN ALFRED ALLEN KNIGHT, Chevalier Legion d'Honneur, Royal Munster Fusiliers and R.A.F., only child of Mr. and Mrs. Alfred Knight, Launceston, Cornwall, was married on April 24, at Lincoln, to CUNITIA MORESBY.

New President of the R.Ae.S.

At the meeting of the Royal Aeronautical Society last week Maj.-Gen. R. M. Ruck announced that Lord Weir has accepted the invitation to become President of the Society.

A Royal Aeronautical Society Garden Party at Cricklewood

By way of celebrating the end of the War, the jubilee of the Society, and the enrolment of the 1,000th member, the Royal Aeronautical Society of Great Britain is giving a garden party at the Handley Page Aerodrome at Cricklewood on Sunday afternoon next. A programme of flying and parachute descents has been arranged, and, apart from a very comprehensive display of machines and parts by the Handley Page firm, Maj.-Gen. Brooke-Popham, of the Research Department of the Air Ministry, is organising an exhibition which promises to be very interesting. The garden party will be held from 4 to 7 p.m., and members who wish to be present should get in touch with the Secretary, Mr. W. B. Faraday, at 7, Albemarle Street, as early as possible.

"R 34" Visits Germany and Scandinavia

LEAVING her station at East Fortune at 6 p.m. on June 17, the "R 34" carried out a 2,000 mile trip, which, after passing by North Berwick, took her across the North Sea, past Heligoland, Wilhelmshaven, Friedrichshaven, the Kiel Canal, Hamburg and over the Southern Baltic before turning for home. It is stated that during the whole flight the vessel was in wireless communication with home stations, and her long-range apparatus worked satisfactorily. During the homeward

daughter of Mr. and Mrs. Charles SANDERS, Fawnees Hall, Wolsingham, Co. Durham.

Capt. DEREK FITZGERALD MASSY, 33rd Ind. Cav., R.A.F., fourth son of the late Maj. Hugh Ingoldsby Massy and Mrs. Massy, of Stoneville and Cloughnaroold, Co. Limerick, Ireland, was married on June 3 at Murree, India, to MARGARET VIDA SMITH, daughter of the late Mrs. Anne SMITH, of Hampstead and Bradford.

Capt. JOSEPH ABBOTT SEAVER, North'd. Fus., youngest son of Capt. Jonathan Seaver, R.A.F., and grandson of the late Thomas Seaver, Heath Hall, County Armagh, was married on June 12 at St. George's, Cam, Glos., to MARY VIOLET, daughter of Rev. William SEAVER, Vicar of Cam, and granddaughter of the late Dean Seaver, of Belfast.

Capt. WILLIAM HODGSON SUGDEN WILSON, West Somerset Yeo, and R.A.F., second son of Mr. Hodgson Wilson and the late Mrs. Hodgson Wilson, of Hexgreville Park, Southwell, was married on June 3 at All Saints' Church, Marlow, to ELINOR, widow of Mr. L. A. N. Slocum, and third daughter of Mr. and Mrs. Arthur Cook, Oaken Grove, Marlow.

Capt. GILBERT FERRERS YARDE, R.A.S.C., and R.A.F., eldest surviving son of Mr. and Mrs. J. E. Yarde, of Bedford, was married on June 11 at St. Margaret's, Westminster, to CONSTANCE MARIANNE, youngest daughter of the late A. H. PARGITER, of Ceylon, and Mrs. Pargiter, of 11, Victoria Street, Westminster.

To be Married

The marriage arranged between Capt. R. L. CHARTERIS and Mrs. JAMES VALENTINE will take place very quietly in London the first week in July.

The engagement is announced between Capt. LAURENCE IRVING, late R.A.F., only son of Mr. and Mrs. H. B. Irving, of 10, Sudbury Hill, Harrow, and ROSALIND FRANCES, fourth daughter of Mr. HUGH WOOLNER, of 23, Stanley Crescent, W. 11.

The engagement is announced between Capt. VIVIAN WIGG, 11th London Regt. and R.A.F., son of Mr. Edward Wigg, His Majesty's Consul at Rio Grande, Brazil, and IRENE, only daughter of Mr. and Mrs. HARKLESS WRIGHT, 22, Church Crescent, Muswell Hill, N.

Items

59th Squadron.—A reunion dinner has been arranged to take place on Saturday, July 19, at 7 p.m. at the Holborn Restaurant, London. Will anyone desirous of attending, and who has not been informed personally by letter, notify before July 10 Capt. Oliver, Thrall Hall, Streatham, London, S.W. 16.

The will of Lieut. RAYMOND DE NEWBURGH COAPE ARNOLD, R.A.F., of Wolvey Hall, near Hinckley, Leics., who died as the result of an aeroplane accident in the Midlands, aged 26 years, has been proved at £346.

journey the vessel had to fight her way against a strong westerly breeze for 20 hours. A safe landing was made in the early hours of June 20 after the vessel had been in the air for 56 hours. Maj. Scott was in command, with Maj. Cooke as navigator. The airship was equipped as for war, with Lewis and Vickers guns mounted on the cars and upper platforms, but she carried no bombs.

Long-Distance Flying from France

As soon as peace is signed the French aeronautical authorities intend to map out several aerial routes from Paris, including one to Madrid, another to Prague, Warsaw and Vienna, and others to Brussels and Amsterdam, Cairo via Constantinople, Tunis and Dakar. Among the machines used will be Nieuports, Spads, twin-engined Caudrons, twin-engined Farmans, while it is probable that the pilots will be Maj. Vuillemin, and Lieuts. Fonck, Marinovitch, Flachaire, de Romanet, and Lemaire.

Some French Records

THE Sports Commission of the Aero Club of France has homologated the following records:—

Pilot and four passengers, April 1, 1919, Boussoutrol, 6,290 m.

Pilot and 13 passengers, April 3, 1919, Boussoutrol, 5,990 m.

Pilot and 24 passengers, May 5, 1919, Boussoutrol, 4,860 m.

Aviator alone, September 22, 1917, Gaston Bourgeois, 7,770 m.

Aviator alone, May 9, 1919, Sadi Lecointe, 8,155 m.

Aviator alone, May 19, 1919, Sadi Lecointe, 8,686 m.

Aviator alone, May 18, 1919, Jean Casale, 9,125 m.



THE ROYAL AIR FORCE

London Gazette, June 13

Technical Branch

To be graded for purposes of pay and allowances of Capts., Grade (A.), whilst employed as Capts.:—Lieut. L. A. Hooper (substituted for the notification in *Gazette* May 27); Sec. Lieut. D. M. Rees; May 1.

To be graded for purposes of pay and allowances of Capts., Grade (B.), whilst employed as Capts.:—Lieut. T. C. Penna, Sec. Lieut. J. Sutherland; May 1.

Sec. Lieut. J. H. Furniss, O.B.E., to be Sec. Lieut., Grade (B.), from (Ad.), and to be graded for purposes of pay and allowances of Capt., Grade (B.), whilst employed as Capt.; May 1.

Lieuts. (O.) to be Lieuts.:—B. L. Blomley; July 27, 1918 (substituted for the notification in *Gazette* Aug. 30, 1918). W. V. Hunt, Grade (B.); Oct. 1, 1918 (substituted for the notification in *Gazette* June 6).

Lieut. H. T. Thompson to be Lieut., Grade (A.), from (S.O.), and to retain the actg. rank of Capt., from April 1, 1918, to April 10.

Sec. Lieut. (actg. Lieut.) L. G. Bullock to be Lieut.; March 26.

Sec. Lieut. H. H. Weller to be actg. Lieut. whilst employed as Lieut., Grade (A.), from March 20 to April 30.

Sec. Lieut. J. Dale to be graded for purposes of pay and allowances as Lieut. whilst employed as Lieut., Grade (A.); May 1.

Sec. Lieut. W. W. Hammond to be Sec. Lieut., Grade (B.), from Grade (A.); June 4.

Sec. Lieut. A. Sheppard (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut., Grade (B.); April 17.

Sec. Lieut. J. H. Stone to be Sec. Lieut., Grade (A.), from (Ad.); Nov. 13, 1918.

Sec. Lieut. E. C. G. Vines, to be Sec. Lieut., Grade (B.), from (Ad.); Nov. 1, 1918.

Sec. Lieut. J. W. McKee (Sec. Lieut., R.F.A.) relinquishes his commn. on ceasing to be employed; March 15.

(Then follow the names of 20 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. L. V. Mackenzie relinquishes his commn. on acct. of ill-health contracted on active service, and is granted the rank of Lieut.; June 4.

The initials of O. C. Lees are as now described, and not as stated in *Gazette* of May 27.

The surname of H. D. Stanier is as now described, and not as stated in the *Gazette* of May 27.

The notification in the *Gazette* of March 28 concerning Lieut. (actg. Capt.) R. W. Mitchell is cancelled. The notification in *Gazette* of April 8 to stand.

Medical Branch

W. A. Malone (Capt., R.A.M.C., S.R.) is granted a temp. commn. as Capt.; June 1.

Chaplains Branch

The Rev. W. P. Young, D.C.M. (R.A.C. Dept.), relinquishes his commn. on ceasing to be employed; June 14.

Memoranda

(Then follow the names of 383 Overseas Cadets who are granted temp. commns. as Sec. Lieuts.)

Flight Cdt. 177075 F. Silver is granted an hon. commn. as Sec. Lieut.; April 9.

Sec. Lieut. V. B. Napier to take rank and precedence as if his appointment as Sec. Lieut. bore date March 26.

(Then follow the names of 5 officers who are transfd. to the Unemployed List under various dates.)

Brigadier-General (Staff).—Lieut.-Col. C. L. N. Newall, C.M.G., A.M., to be graded for purposes of pay and allowances of Brig.-Genl. (Staff); May 1, whilst employed as Chief Staff Officer of an Area.

The following temporary appointments are made:—

Staff Officers, 2nd Class.—(P.) Capt. A. H. S. Baker; Nov. 18, 1918, and to be actg. Maj. till April 30, vice Capt. (Hon. Maj.) (actg. Maj.) R. H. Howell (substituted for the notification in *Gazette* April 29). (T.) Maj. J. T. Babington, D.S.O.; June 11.

Flying Branch

Lieut.-Col. W. R. Freeman, D.S.O., M.C., to be Lieut.-Col. (A.), from Group Comdr.; June 3.

Maj. R. Grey to be actg. Lieut.-Col. whilst employed as Lieut.-Col. (A.); April 24.

Capt. H. C. Irwin to be graded for purposes of pay and allowances of Capt. whilst employed as Capt. (A'ship); Nov. 8, 1918 (substituted for the notification in the *Gazette* of May 6).

Capt. C. A. Hervey to be graded for purposes of pay and allowances of Capt. whilst employed as Capt. (K.B.); Jan. 1.

Lieut. H. A. Miller to be actg. Capt. whilst employed as Capt. from Dec. 1, 1918, to May 27.

Lieut. A. C. Upham to be Lieut. (A.), and to relinquish the actg. rank of Capt. on ceasing to be employed as Capt.; March 30.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts. (A.):—F. C. Hilbert; June 20, 1918. W. E. Gemmill; July 26, 1918. S. R. Dickson; Sept. 22, 1918.

The following relinquish their commns. on ceasing to be employed:—Lieut. J. Malcolm (Lieut., Can. Forestry Corps); Feb. 7. Capt. W. J. Rutherford (Lieut. (Temp. Capt.), Quebec R.); March 31. Lieut. A. A. Browne (Lieut., N.Z.); April 24. Lieut. R. Dodds, M.C. (Lieut., (Temp. Capt.), Cent. Ont. R.); May 4. Lieut. H. A. O'Connor (Lieut., R.G.A.); May 16. Sec. Lieut. (Hon. Lieut.) S. J. R. B. Simmons (Lieut., Lond. R.); May 27. Sec. Lieut. (Hon. Lieut.) G. Ibberson (Lieut., Border R.); June 2.

(Then follow the names of 60 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space it is impossible to reprint this portion of the List.—ED.)

Lieut. (Hon. Maj.) C. R. Ingleby relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Maj.; May 24.

Lieut. (Hon. Capt.) C. E. Holman relinquishes his commn. on account of ill-health, and is granted the rank of Capt.; May 29.

The following relinquish their commns. on account of ill-health, and are permitted to retain their rank:—Lieut. F. Adams (caused by wounds); May 15. Lieut. W. G. Claxton, D.S.O., D.F.C. (caused by wounds); May 20. Sec. Lieut. R. C. Blanchard (contracted on active service); May 27.

Lieut. W. F. Creery (Conn. Rangers) resigns his commn. and is permitted to retain his rank; June 18.

The surname of Lieut. E. R. James is as now described, and not "Jones," as stated in the *Gazette* of March 28.

The notification in the *Gazette* of Feb. 4 concerning Lieut. C. F. Day (Lieut., E. Ontario R.) is cancelled.

The notification in the *Gazette* of April 18 concerning Lieut. F. G. Carpenter is cancelled.

The notification in the *Gazette* of April 29 concerning Sec. Lieut. J. Cooke is cancelled.

The notification in the *Gazette* of May 13 concerning Sec. Lieut. F. D. Cowan is cancelled.

The notification in the *Gazette* of May 30 concerning Sec. Lieut. A. A. Baker is cancelled.

Administrative Branch

Maj. R. H. Howell to be Maj., from S.O.; Nov. 18, 1918 (substituted for the notification in the *Gazette* of May 27).

Maj. F. B. Burton to be Maj., from S.O.; May 1.

Sec. Lieut. L. J. Grant to be graded for purposes of pay and allowances of Maj. whilst employed as Maj.; May 1.

Capt. C. D. Smart, M.C., to be Capt., from (A.); June 3, 1918 (substituted for the notification in the *Gazette* of April 8).

J. H. Hannay (Temp. Capt., R.A.S.C.) is granted a temp. commn. as Capt., with seniority from April 1, 1918; Oct. 29, 1918.

Lieuts. to be graded for purposes of pay and allowances of Capts. whilst employed as Capts.:—T. F. Davis, R. T. Kelly; May 1.

Lieut. W. H. Crotty to be graded for purposes of pay and allowances as Capt. whilst employed as P. T. Officer; May 21.

Sec. Lieut. J. McGilley to be graded for purposes of pay and allowances as Capt. whilst employed as Capt.; May 1.

Lieut. L. H. Hillier to be Lieut., from (A.); April 17.

Lieuts. to be Lieuts. from (S.O.):—D. Blairman, F. A. Corbett; May 1 (substituted for the notification concerning these officers which appeared in *Gazette* of May 16).

The following are granted temp. commns. as Lieuts.:—A. E. Enders (Lieut. and Qmr., Spec. List); April 26, 1918. P. L. Harris (Temp. Lieut., R. Irish Rif.); Aug. 8, 1918, with seniority from April 1, 1918. A. T. Redgwell (Temp. Lieut., Spec. List); Sept. 17, 1918, with seniority from April 1, 1918.

Sec. Lieut. W. D. Cooney to be actg. Lieut., with pay and allowance of that rank, while employed as Lieut. (from Sept. 16, 1918, to April 30); (substituted for the notification in *Gazette* of May 23).

Sec. Lieut. P. A. Stallard (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut.; Sept. 14, 1918.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. (actg. Lieut.) E. F. P. Bartlett (Lieut., Hants. R.); Feb. 19. Capt. E. Mills (Capt. and Qmr., R. West Kent R.); June 3.

(Then follow the names of 12 officers who are transfd. to the Unemployed List under various dates.)

Capt. J. Allen relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; June 5.

Capt. H. W. Morgan (K.R.R.C.) relinquishes his commn. on account of ill-health contracted on active service; May 29.

Lieut. V. B. Allen relinquishes his commn. on account of ill-health, and is permitted to retain his rank; May 20 (substituted for the notification in *Gazette* of Feb. 18).

Lieut. F. W. Young (Worc. R.) relinquishes his commn. on account of ill-health contracted on active service; June 2.

The notification in *Gazette* May 25, 1918, concerning Sec. Lieut. E. G. Brett is cancelled.

The notification in *Gazette* Dec. 13, concerning J. H. Hannay is cancelled.

The notification in *Gazette* Jan. 21, concerning J. H. Hannay is cancelled.

The notification in *Gazette* Feb. 25, concerning Sec. Lieut. J. M. Adams (Gordon Highrs.) is cancelled.

The notification in *Gazette* April 11, concerning Sec. Lieut. F. A. Pritchard is cancelled.

The notification in *Gazette* May 6, concerning Sec. Lieut. C. L. H. Johnson (Essex R.) is cancelled.

The notification in *Gazette* May 27, concerning Capt. (Hon. Maj.) T. M. Ross is cancelled.

The notification in *Gazette* May 27, concerning Lieut. (Hon. Capt.) F. F. McKenna is cancelled.

The notification in *Gazette* May 30 concerning Sec. Lieut. A. E. H. Hales is cancelled.

Technical Branch

Lieut.-Col. T. E. St. C. Daniel, O.B.E., M.C., to be Lieut.-Col., from Deputy Director; April 1 to April 30 (substituted for the notification in *Gazette*, June 6).

Capt. C. D. Smart, M.C., to be Lieut. (Hon. Capt.), Grade A, from (Ad.); Feb. 10 (substituted for the notification in *Gazette* April 8).

Lieut. F. Briggs to be actg. Capt. whilst employed as Capt., Grade (B); Dec. 1, 1918 to April 30.

Lieuts. to be graded for purposes of pay and allowances of Capt. whilst employed as Capts., Grade (A):—(Hon. Capt.) J. F. Bargman, A. Howard, E. F. Moulder, F. Murphy, A. J. M. Ross; May 1.

Lieut. J. E. R. Avery to be graded for purposes of pay and allowances of Capt. whilst employed as Capt., Grade (B); May 1.

Lieut. R. Macfarlane to be Lieut., Grade (A), from (Ad.); May 13.

Lieut. W. a. B. Probert to be Lieut., Grade (A), from (Ad.); Nov. 7, 1918 (substituted for the notification in *Gazette* May 20).

Lieut. A. E. Burton to be Lieut., Grade (B), from (Ad.); May 5.

Sec. Lieuts. to be graded for purposes of pay and allowances of Lieuts. whilst employed as Lieuts., Grade (A):—A. H. Harrison, E. W. Hooton-Smith; May 1.

Sec. Lieut. S. F. Coleman to be Sec. Lieut., Grade (A), from (A.); May 31.

Sec. Lieut. E. H. Hughes to be Sec. Lieut., Grade (A), from Grade (B); Oct. 25, 1918 (substituted for the notification in *Gazette* Jan. 24).

Sec. Lieut. J. A. Wilson to be Sec. Lieut., Grade (B), from (O.); May 31.

Lieut. H. B. Harvey (Lieut., R.H. and R.F.A.) relinquishes his commn. on ceasing to be employed; June 3.

Sec. Lieut. (Hon. Lieut.) L. G. Martin has been transfd. temporarily to the Unemployed List, from March 27 to May 7.

(Then follow the names of 14 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. C. D. Watt relinquishes his commn. on account of ill-health, and is permitted to retain his rank; May 19 (substituted for notification in *Gazette* of Jan. 7).

Medical Branch

A. L. Robinson is granted a temp. commn. as Capt.; June 12.

Capt. R. C. Fuller is transfd. to the Unemployed List; April 10.

Chaplains' Branch

The Rev. J. L. Thomas, M.C. (Temp. Chap. to the Forces, 4th Class R.A.C.D.), is granted a temp. comm. as Chaplain, with relative rank of Capt.; June 12.

Memoranda

The following are granted the actg. ranks stated against their names, with effect from May 1:—

To be actg. Lieut.-Cols. whilst specially employed:—Maj. R. Hall, M.B.E., Maj. E. L. Conran, M.C., Maj. E. H. Sparling, Maj. O. T. Boyd, M.C.

To be actg. Majs. whilst specially employed:—Capt. L. M. Lilley, O.B.E., Capt. L. J. Bayley, M.C., Capt. F. R. P. Dexter, Capt. F. H. Hawksford,

To be actg. Capts. whilst specially employed:—Lieut. (Hon. Capt.) L. N. Sutherland, Lieut. G. H. Havelock-Sutton, M.C., Lieut. A. Eggar, Lieut. L. G. Paget, Lieut. L. Clarke, Lieut. A. J. G. Styran, M.C., Lieut. G. C. O'Donnell, Lieut. C. E. W. Lockyer, Lieut. J. Cullen, A.F.C., Lieut. A. E. L. Skinner, M.C., Lieut. W. Sharpe, Lieut. C. A. Farquharson, Lieut. A. D. Makins, Lieut. G. J. Blackmore, Lieut. A. M. Thomas, Lieut. H. D. Lehmann.

The following are granted the actg. rank of Maj. without pay and allowances of that rank whilst employed as Recruiting Officers, with effect from May 1:—Capt. W. G. Scott, Lieut. F. T. Chapman, Lieut. R. Tait, Lieut. G. B. Redgrave, Lieut. A. R. Harris, F. V. Bell, Sec. Lieut. A. E. H. Hales.

Flight Cadet 740482 V. Sparkes is granted an honorary commn. as Sec. Lieut.; June 14.

The following relinquish their commns. on ceasing to be employed:—Temp. Hon. Lieut. L. G. Parker; April 9. Temp. Hon. Lieut. J. L. Manson, Temp. Hon. Capt. L. F. de Peyrecave; April 16. Temp. Hon. Capt. C. H. Adams; May 21. Temp. Hon. Lieut. W. C. S. Phillips; June 16.

London Gazette, June 20

The following temporary appointments are made:—
Chief of Air Staff.—Maj.-Genl. Sir H. M. Trenchard, K.C.B.; D.S.O.; Feb. 11 (substituted for notification in the *Gazette* of May 20).

Director of Training and Organisation.—Col. (actg. Maj.-Genl.) P. W. Game, C.B., D.S.O., relinquishes the actg. rank of Maj.-Genl. and to be actg. Brig.-Genl. while so employed; March 8 (substituted for notification in the *Gazette* of May 20).

Director of Equipment.—Col. (actg. Maj.-Genl.) C. L. Lambe, C.M.G., D.S.O., relinquishes the actg. rank of Maj.-Genl. and to be actg. Brig.-Genl. while so employed; Feb. 27 (substituted for notification in the *Gazette* of May 20).

Deputy Directors.—Lieut.-Col. E. R. Ludlow-Hewitt, C.M.G., D.S.O., M.C. and to be actg. Col. while so employed; June 1. Col. B. C. H. Drew, C.M.G., from Director; May 1 to June 7. Lieut.-Col. J. G. Hearson, C.B.E., D.S.O., from Director; May 1 to May 21, and to be actg. Col. while so employed.

Staff Officer, 1st Class (Air).—Maj. G. J. Watney; May 1.

Staff Officers, 2nd Class (Air).—Capt. W. E. G. Bryant, Maj. E. G. H. Clarke, M.C., from S.O., 1st Class, Capt. B. H. Sisson; May 1. (T.)—Capt. (actg. Maj.) L. J. Killmayer, M.B.E.; March 13, and to retain the actg. rank of Maj. till April 30.

Staff Officers, 3rd Class (Air).—Maj. J. E. Speranza, from S.O., 2nd Class; Capt. W. A. A. Chauncey, from S.O., and 1st Cl.; Capt. C. S. Morice, M.C.; Capt. R. N. Montague-Stuart-Wortley, M.C.; Capt. G. L. Tyser; May 1. Capt. V. R. Gibbs, D.S.C.; May 26. (P.)—Capt. H. M. Earnshaw; June 6, vice Capt. P. A. Moodie.

Staff Officer, 4th Class (Air).—Lieut. B. H. Godfrey; May 1.

The following temporary appointments are made:—

Staff Officer with Fleet.—Lieut.-Col. R. E. C. Peirse, D.S.O., A.F.C., and to be graded for purposes of pay and allowances as Col., Staff, from (A. and S.); June 5. Vice Lieut.-Col. (actg. Col.) R. H. Clark-Hall, D.S.O.

Staff Officers, 1st Class (Air).—Lieut.-Col. J. R. W. Smyth-Pigott, D.S.O.; May 24. (P.)—Lieut.-Col. L. W. B. Rees, V.C., M.C., A.F.C.; April 30.

Staff Officer, 2nd Class (P.).—Maj. G. F. H. Faithfull; June 10.

Staff Officer, 3rd Class (P.).—Lieut. L. C. Tyson; April 30.

Flying Branch

Sec. Lieut. H. Douglas to be Lieut.; Oct. 15, 1918.
Fit. Cadet F. O. Huntrods is granted a temp. commn. as Sec. Lieut. (O.); Nov. 30, 1918.

The following relinquish their commns. on ceasing to be employed:—Lieut. R. Brown; July 13, 1918. Sec. Lieut. (Hon. Maj.) H. Preistman (Maj., New Brun. R.); Oct. 5, 1918. Sec. Lieut. T. E. Winkworth (Lieut., Can. Forces); Feb. 2. Lieut. E. E. Burdett (Lieut., Cent. Ont. R.); Feb. 21. Sec. Lieut. J. Atkinson (Sec. Lieut., Border R., T.F.); March 3. Lieut. H. B. P. Boyce (Lieut., Sask. R.); April 19. Lieut. W. G. Bell (Lieut., C. Ont. R.), Lieut. W. A. Campbell (Lieut., Can. Reserves); May 1. Sec. Lieut. (Hon. Capt.) W. Mackenzie (Capt., N.Z. Dental C.); May 6. Sec. Lieut. (Hon. Lieut.) W. J. Dalziel (Lieut., Sask. R.); May 9. Lieut. A. Maxwell (Lieut., R. Scots); May 13. Sec. Lieut. (Hon. Lieut.) R. A. Neilson (Lieut., Can. F. Art.); May 19. Lieut.-Col. W. H. C. Mansfield, D.S.O. (Capt., Shrops. L.I.); May 28. Lieut. A. W. J. Lyons (Sec. Lieut., R.A.S.C.); May 30.

(Then follow the names of 152 officers who are transfd. to the Unemployed List under various dates. We regret that owing to great pressure on our space it is impossible to reprint this portion of the List.)

Capt. C. D. Fuller (Lieut., R. Suss. R.) resigns his commn., and is granted the rank of Maj.; June 21.

Capt. W. A. Curtis, D.S.C., relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; June 11.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. N. Blacklock; June 4. S. R. Coward (caused by wounds); June 6.

Lieut. G. M. Shaw (C. Ont. R.) relinquishes his commn. on account of ill-health contracted on active service; May 21.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. D. Irvine; Feb. 10 (substituted for notification in *Gazette* Jan. 28). A. L. Fachnie; June 6. J. H. Jacques (contracted on active service); June 8. W. Cowan; June 12.

The following Sec. Lieuts. are dismissed the Service:—W. P. Powers; Oct. 4, 1918 (for absence without leave). G. Gayman; April 23.

The name of Sec. Lieut. J. Spencer is as now described, and not as stated in *Gazette* May 23.

The Christian names of J. A. Fraser are as now described, and not A. J. Fraser, as stated in *Gazette* Oct. 25, 1918.

The notification in *Gazette* May 23 concerning A. J. Bird is cancelled.



A London Flying Club

THE organisation of the London Flying Club has now progressed to the stage when it is possible to announce that the Club, of which Earl Lonsdale is President, will be opened at Hendon next month. We understand that many applications for membership, which will be by ballot only, have already been received. The ordinary members' annual subscription is £10 10s.; members of the Royal Aero and the Sussex County Aero Clubs, £8 8s.; R.A.F. members, £5 5s. There will also be honorary members, including all officers who have won the Victoria Cross for acts of gallantry in

The notification in *Gazette* of April 4 concerning Lieut. W. J. Saunders is cancelled.

The notification in *Gazette* of Apr. 11 concerning Lieut. W. B. Walker, D.F.C., is cancelled.

The notification in *Gazette* Jan. 21 concerning Capt. G. L. Hartgill is cancelled. (*Gazette* notice of June 13 to remain.)

The notification in *Gazette* April 15 concerning Sec. Lieut. C. Macpherson is cancelled.

The notification in *Gazette* Oct. 29, 1918, concerning Sec. Lieut. E. P. Smith is cancelled.

The notification in *Gazette* June 10 concerning Capt. J. Clisdal is cancelled.

The date of appointment of Sec. Lieut. (Hon. Capt.) H. W. Beck to be Lieut. is Nov. 1, 1918, and not March 29, as stated in *Gazette* May 23.

The date of appointment of Sec. Lieut. H. W. Heslop to be Lieut. is April 9, 1918, and not April 2, 1918, as stated in *Gazette* March 7.

Administrative Branch

The following are granted the actg. rank stated against their names from May 1:—Actg. Cols.:—Lieut.-Col. F. H. G. Playfair, without pay and allowances of that rank whilst employed as Permanent President of Courts-Martial; Lieut.-Col. A. W. C. McFall, without pay and allowances of that rank, whilst employed as Permanent President of Courts-Martial; Maj. W. P. Alexander, with the pay and allowances of Lieut.-Col., whilst employed as Permanent President of Courts-Martial. Actg. Lieut.-Cols.:—Maj. D. Mackenzie, whilst employed as Permanent President of Courts-Martial; J. R. Gould (Capt. K.A.R.) is granted a temp. commn. as Lieut.; Aug. 24, 1918, and to be Hon. Capt.

Sec. Lieuts. to be Lieuts.:—R. N. Preece; July 22, 1918. W. B. Walker, D.F.C.; March 1.

The following are granted temp. commns. as Sec. Lieuts.:—H. J. Bamber, R. T. Barton, F. G. Brigden, F. Narris, R. W. Stewart, A. P. Webley; June 16.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. C. L. H. Johnson (Temp. Sec. Lieuts., Essex R.); Aug. 10, 1918. Lieut. A. Rawlins (Lieut., 5th Ltns.); March 6. Lieut. A. F. G. Vivian (Lieut. R. Fus.); May 31.

(Then follow the names of 34 officers who are transfd. to the Unemployed List under various dates.)

Lieut. J. K. Line relinquishes his commn. on account of ill-health and is permitted to retain his rank; June 6.

Lieut. G. F. Bishop (Lond. R., T.F.) is dismissed the Service by sentence of a General Court-martial; March 10.

The notification in *Gazette* of Nov. 18, 1918, concerning J. Inglis (Temp. Capt., R. Highrs.) is cancelled.

The notification in *Gazette* of March 7 concerning Lieut. F. Crossley is cancelled.

The notification in *Gazette* of May 2 concerning Sec. Lieut. T. A. Chilcott, is cancelled.

The notification in *Gazette* of June 10 concerning Sec. Lieut. (Hon. Lieut.) A. V. Collins is cancelled.

Technical Branch

R. E. Threlfall (Lieut., R.E.) is granted a temp. commn. as Lieut., Grade (A.); Sept. 14, 1918 (substituted for notification in *Gazette* of Dec. 6, 1918).

Sec. Lieut. W. S. C. Stephens to be Lieut.; April 2, 1918.

Sec. Lieuts. to be Lieuts. without pay and allowances of that rank:—A. V. Sutton; April 2, 1918. G. F. Kite; Dec. 29, 1918. R. E. Hussey; Feb. 5.

The following Cadets are granted temp. commns. as Sec. Lieuts., Grade (B.): 1543 G. H. Taylor, 403803 W. J. Cole, 24897 A. Gold, 403562 G. Wells; Nov. 12, 1918.

(Then follow the names of 29 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. F. Guinan; June 6. W. Gregory (caused by wounds); June 11.

The notification in *Gazette* of March 11 concerning Sec. Lieut. C. MacPherson is cancelled.

Chaplains' Branch

Capt. C. E. Kindersley is transfd. to the Unemployed List; April 23.

The Rev. F. H. Wheeler, D.S.O., Temp. Chaplain to the Forces, 2nd Class, R.A.C.D. (United Board), is granted a temp. commn. as Chaplain, with the relative rank of Capt., and is granted the relative rank of Maj. while employed as Asst. Principal Chaplain (United Board); April 17.

Memoranda

Sec. Lieut. (Hon. Lieut.) A. A. J. Poole is granted hon. rank of Capt.

H. H. Stodley is granted a temp. hon. commn. as Lieut.; June 4.

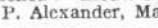
The following Overseas Cadets are granted temp. commns. as Sec. Lieuts.: 152676 H. F. Blandy, 187255 S. T. Cochrane, 176511 H. H. Devenish, 49397 V. Delplanche, 182108 M. E. Guy, 126895 E. H. Hodgson, 182176 C. H. M. Lowry, 184273 E. P. Oertel, 182277 C. Ryneveld, 216232 W. A. Spurr; Feb. 15.

The following Cadets are granted hon. commns. as Sec. Lieuts.:—17745 A. G. Ashbourn; Jan. 15. 176016 F. J. Pope; Feb. 8. 538084 E. P. Stanford; Feb. 21. 5535 J. O. Morrison; March 28. 44421 W. Garner; April 23 46576 E. Charlton; May 20.

The following relinquish their commns. on ceasing to be employed:—Temp. Hon. Lieut. D. W. Ditchburn; Feb. 5. Temp. Hon. Lieut. W. J. Parkinson; Feb. 23. Temp. Hon. Lieut. E. Quixley, Temp. Hon. Lieut. W. Sutton, Temp. Hon. Lieut. G. H. Tattersall; March 16. Temp. Hon. Lieut. G. P. Muirhead; April 16. Temp. Hon. Lieut. M. C. Boff, Temp. Hon. Lieut. R. J. Grant, Temp. Hon. Lieut. J. B. Greer, Temp. Hon. Lieut. R. B. Verney, Temp. Hon. Lieut. M. R. Whitham; May 16. Temp. Hon. Lieut. H. J. Lucking, Temp. Hon. Lieut. J. A. Turner; May 31. Temp. Hon. Capt. T. Greenup; June 15. Temp. Hon. Lieut. F. C. L. Brendel, Temp. Hon. Lieut. C. H. Piroth, Temp. Hon. Lieut. A. J. Simpson; June 16.

Transferred to Unemployed List.—Lieut. D. C. Sutherland, from (S.O.); May 17. Sec. Lieut. (Hon. Capt.) H. F. L. Dixon, from (S.O.); May 31 Capt. P. A. Moodie, from (S.O.); June 7.

The notifications in *Gazette* of May 9 concerning the following officers are cancelled:—Lieut.-Col. F. H. Playfair, Lieut.-Col. A. W. C. McFall, Maj. W. P. Alexander, Maj. D. Mackenzie.



connection with aerial services. Members of the London Flying Club will have an interchange of privileges with the Sussex County Aero Club at Shoreham. At present there is no entrance fee. The Secretary is Maj. G. B. Ollivant.

Aviation at Brighton

WE understand that arrangements have now been completed for aerial services. The Corporation have granted permission for the starting and landing of machines on "The Ladies' Mile," while permission has also been given for seaplanes to operate from the beach.

SIDE-WINDS

It is reported that the recent attempt of the famous French champion, Fonck, on the world's height record failed at 29,250 ft., owing to his lubricating oil freezing. Obviously a case where he should have been using Castrol R, which has never yet given trouble from such a cause, however low the temperature. On the notable flight made by Capt. Lang last January at Martlesham Heath a temperature of 70° of frost was registered, but Castrol R did its work perfectly throughout, with great credit to Messrs. Wakefields.

FROM the Goldsmiths' and Silversmiths' Company comes a charming souvenir in connection with the presentation swords with which the Corporation of London have honoured Admiral Sir David Beatty and Field-Marshal Sir Douglas Haig. There are beautifully reproduced drawings of the two swords, together with a description of the swords and the decorations. They were both excellent examples of the superb craftsmanship of the Goldsmiths' and Silversmiths' Company.

To all who are interested in woodworking, a little book which has recently been published by Messrs. Thomas Robinson and Son, Ltd., of Railway Works, Rochdale, should prove both useful and helpful. It is entitled "Instructions Showing How to Prepare Saws for Log-Band Mills and Resaws," and doubtless all who have to do with this kind of work will be glad to have a copy. We understand that Messrs. Thomas Robinson and Son will be pleased to send one to any of our readers who are really interested, if they will send in a request to WLW. Department, addressed as above. The author, Mr. Arthur H. Smith, is a well-known expert on saws and their treatment, and while in a book of this size it is impossible to deal with every aspect of the subject, he has undoubtedly dealt with the more important points in a most thorough and practical way.

READERS of FLIGHT are well acquainted with the various types of aeroplanes which are being produced by the Bristol British and Colonial Aeroplane Co. The range of these machines is strikingly brought out in a little album which the firm have just published. It has a frontispiece in colours showing some Bristol machines engaged in a scrap with some Huns, while there are two full-page photographs, excellently reproduced, of each type of Bristol machine now being built, together with the leading particulars of each one.

FROM Messrs. James Archdale and Co., Ltd., the well-known machine-tool specialists of Birmingham, come two books which should be on the shelf of every works manager. One deals with various styles and types of drilling machines, while the other relates to milling machines, cutters, etc. In both cases they are very fully illustrated, and packed with information regarding the specialities for which Messrs. James Archdale and Co., Ltd., are renowned.

THE Cambridge School of Flying have got out a useful little booklet setting forth some details regarding their School, and the various courses of instruction which they offer. They will be pleased to supply a copy to any one applying to them at 2, Downing Street, Cambridge.

ALL who want sheds or hangars should note that Messrs. Archibald Dawnay and Co. have just had a little booklet printed giving some details of a type of hangar which they can build up to practically any size or to accommodate any machine that is being, or likely to be, made. They will be pleased to supply a copy to any one interested in the subject, who will write to them at Steelworks Road, Battersea, S.W.11.

THOSE who own either British or American cars equipped with starting and lighting batteries, will doubtless find much to interest them in a new list which has been got out by the Chloride Electrical Starting Co., Ltd., Clifton Junction, near Manchester. The Exide battery has been largely used for several years past in connection with many starting and lighting systems on American cars, and the X.C., which is now being marketed over here, is identical with the battery which has met with such success in the States. It will be understood, therefore, that these replacements are eminently satisfactory on American cars, as well as being suitable for cars of British manufacture. The list gives not only the prices, but also the dimensions and weight of each battery.

It is well-known that sea air has adverse effects on many materials, and when combined with extremes of heat and cold, it constitutes a very severe test on the stability of glues. In the recent Transatlantic flight, the well-known Croid liquid glue had a unique opportunity of demonstrating its efficacy under the most stringent conditions. We understand that this glue was used throughout the Vickers-Vimy machine, and we are not surprised to hear that, in spite of the trying experiences, it stood the test and fulfilled all that had been claimed for it.

MESSRS. J. DAVIS AND CO., 43, Basinghall Street, London, E.C. 2, who make a speciality of Sylvana aluminium paint, are so satisfied that they have got a really good thing, that they will be pleased to supply any firm interested with a sample gallon of the paint, which they claim is very satisfactory in use on fabrics. We understand that the paint is made of the best aluminium obtainable combined with a liquid, which results in a silvery surface, drying with a hard and glossy surface. They are selling the paint in two forms, mixed or unmixed. For the latter, the powder and liquid are supplied separately, in the proper proportions, and it is stated that this method not only gives better results, but is more economical than the mixture. The firm will be pleased to answer any queries regarding their paint.

WE understand that Mr. T. H. Dryden is relinquishing his connection as Managing Director of the Skefko Ball-Bearing Co., Ltd., Luton, on the 30th inst. He joined the above Company in 1912 as Commercial Manager, and his tactful initiative, combined with a genial personality, soon gained for him the position of Managing Director. Although the original factories in Luton were planned with a view to providing for extensions, the almost phenomenal growth of the business under Mr. T. H. Dryden's management necessitated practically the remodelling of the whole of the workshops and offices, and the Skefko Ball-Bearing Co., Ltd., may now boast of works second to none in the district. We have not been informed of Mr. T. H. Dryden's intended sphere of action, but we are quite certain he has the very best wishes of the many friends he has made in the engineering and commercial world.

Not only are the present prices of paper and printed matter a serious matter to many business men, but labour shortage is causing delays in deliveries; and printed matter that is delayed very often loses much of its value. Many business men are finding a solution to the problem of small printing jobs by installing in their own offices the miniature rotary printing press known as the Gammeter Multigraph. This machine, which takes up no more room than a roll-top desk, can be worked by any ordinarily intelligent office girl or youth, and turns out really beautiful two colour printing jobs, from type or electros. In addition it types multiple letters by means of metal type printing through a ribbon on to a rubber typewriter platen that so closely resemble individually typed letters that only an expert could detect the difference.

THE Gammeter Multigraph is not only solving the difficulty of producing printed matter in any desired quantity on the spot: it is also to a large degree, solving the question of price. Printed matter produced in this machine costs, on an average, 40 per cent. less than usual, so that the initial cost of the equipment (which is not very great) is soon paid off, and considerable money saved thereafter as the machine is more and more used. Readers interested in this machine should write to International Multigraph Co., 59, Holborn Viaduct, E.C. 1, for further particulars.

IN connection with the development of commercial flying services in this country, we understand that there are some positions open which should provide good opportunities for those who have seen service in the R.A.F. as equipment officers. The duties would be somewhat similar, and we should be pleased to send on any enquiries from those who have had experience in this line.

It will be interesting to many who are looking for bargains among the surplus aircraft equipment which the Government is now dispersing, to hear that a representative show of aircraft and accessories has been arranged near the main entrance of the Agricultural Hall. The goods, in bulk, are at the Aircraft Salvage Factories at Hendon and Waddon (near Croydon), and permits to view can be obtained from the Controller, Aircraft Disposal Department, Kingsway, W.C.

Claims by Inventors

THE Royal Commission on Awards to Inventors, Mr. Justice Sargent presiding, heard evidence regarding two claims on Monday.

The first claim was one by the Sopwith Aviation Co. (Ltd.), for £3,950 in respect of the Sopwith-Kauper Synchronising Gear, a gear for enabling machine-gun fire to be made through the propeller blades of aeroplanes without damaging the propellers.

The Chairman said there was another claim before the Commission in connection with a swivelling synchronising gear, and he would be glad if the claimants would indicate the difference between the two gears.

Mr. Baker, for the claimants, said that he had not heard of the other gear. He said that the Ministry of Munitions had admitted that 2,750 sets of the Sopwith-Kauper gear had been used, and they had agreed to a royalty of £1 per set. There were also certain renewals and repairs, but he understood that the Ministry took the view that there was no case for increasing the royalty. He was informed that a revision of the figures showed that the number of sets of gear used was actually 3,950, and not 2,750.

The Chairman pointed out that there had been no dispute in regard to the claim, but it had to come before the Commission as the Government Department had not any general authority to make payment exceeding £1,000. He said that the decision of the Commission would be announced to the Treasury in due course.

The other claim was by Lieut.-Col. Shortt in respect of "tying-off sleeves" for kite balloons, the object of which was the saving of hydrogen gas.

Mr. James Whitehead, who appeared for the claimant, said that the disputes with the Crown were: (1) The claimant said many thousands of pounds had been saved by the use of the invention, while the Crown suggested that the saving was not nearly so great. The claimant mentioned 5 per cent. on one year's saving as the basis of award. (2) It was said there was no invention merit, the device being an obvious expedient to prevent waste. (3) It was held that the saving of hydrogen gas was not a proper basis of claim. (4) It was stated that altogether 346 kite balloons had been fitted with the device, of which only 75 were inflated at one time. The figures now put in were that 120 balloons had been fitted and 45 kept inflated.

The balloons to which the invention applied, added counsel, were of the B type, but he understood that it was also applied to what was known as the R type. He pointed out that before Col. Shortt's invention there was, in the course of a balloon's ascent, a considerable loss of hydrogen, amounting to about 5,000 cub. ft. if the altitude attained were 5,000 ft. That meant that the balloon's full capacity of 30,000 cub. ft. was reduced to 25,000 cub. ft., and the consequence was that, on its descent, the balloon was in a flabby condition and unsafe if left in that condition. The consequence was that what was called "topping-up" was resorted to, this process being the pumping in of hydrogen to fill the balloon up to its capacity of 30,000 cub. ft. Hydrogen gas cost about £2 per 1,000 cub. ft.

Col. Shortt conceived the idea of fitting two sleeves giving external connection between the air container and the stabiliser. It was then possible to disconnect this container with the stabiliser by two sleeves and thus prevent the escape of gas.

Capt. Worthington, section director in the Kite Balloon Department of the Air Ministry, now of the Directorate of Research, gave evidence for the Crown. In his view the figures available did not show any appreciable decrease in the consumption of gas through the Shortt device. The life of a balloon was three months in winter and one month to one and a half months in summer.

Mr. Watson, for the Ministry of Munitions, said that even though he satisfied the Commission there was no saving he could imagine that they might still be disposed to reward Col. Shortt for his thought and industry, in view of the fact that the device had been largely used. He suggested a small amount for each balloon.

The Chairman said a royalty basis would not be applicable to an *ex gratia* remuneration. The Commission would consider the case.

PUBLICATIONS RECEIVED

The Chemistry and Manufacture of Hydrogen. By P. Litherland Teed. London: Edward Arnold, 41-43, Maddox Street, W. Price, 10s. 6d. net.

Tour of Brazilian Commercial Delegates, June, 1919. Federation of British Industries, 39, St. James's Street, S.W. 1.

NEW COMPANIES REGISTERED

AERONAUTICAL INTELLIGENCE BUREAU, LTD., 30, Bedford Row, W.C.—A company limited by guarantee, with not more than 150 members, each liable for £1 in the event of winding-up, to unite for mutual advancement and protection of certain persons, companies and firms carrying on business as manufacturers of and dealers in and agents for aeroplanes, airships, balloons and parts thereof, to obtain and distribute status information, to promote or oppose legislation, to collect debts, etc. The subscribers are: R. H. Tetley (Palmer Tyre, Ltd.), F. M. Luther (Beardmore Aero Engineering Co., Ltd.), J. Riendl (British Emaillite Co., Ltd.), G. A. Mansfield (Motor, and Aircraft Supplies Co., Ltd.), R. Delphach (Triplex Safety Gear Co., Ltd.), J. F. Inshaw (Auster, Ltd.), W. A. Jewell. The first members of the Council are to be nominated by the subscribers.

HANDLEY PAGE TRANSPORT CO., LTD.—Capital £200,000, in £1 shares, of which 100,000 are preference, entitled to a cumulative preferential dividend of 7 per cent. and two-fifths of the surplus profits available for dividends. First directors: F. Handley Page and T. Page.

* Signature very doubtful.

Aeronautical Specifications Published

Abbreviations:—cyl.=cylinder; I.C.=internal combustion; m.=motors.

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published June 26, 1919

13,686. J. VIAL. Sights for bomb-dropping from aircraft. (127,276.)

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published June 26, 1919

2,918, 3,246 and 3247. MAISON BREGUET and J. L. ROUTIN. Chronotelemetrical apparatus for anti-aircraft guns. (127,290) (127,291) (127,292.)

4,760. F. E. COLLINSON. Altimeters. (127,295.)

4,952. G. P. BRAGG-SMITH, L. B. DESBLEDS, and AERONAUTICAL INSTITUTE OF GREAT BRITAIN. Girder structures for aircraft. (127,299.)

5,029. J. E. ELLOR and Sir H. FOWLER. Aero engines. (127,300.)

5,039. F. COCHRANE. Fabrics having property of invisibility. (127,301.)

5,066. VICKERS, LTD., R. K. PIERSON and T. S. DUNCAN. Tail skids. (127,307.)

5,114. Sir W. BEARDMORE and T. C. W. PULLINGER. Water-jacketed engine cylinders. (127,310.)

5,245. H. B. DUDD. Means of applying tape, etc., to wings of aeroplanes. (127,311.)

5,256. SOC. ANON. DES ATELIERS BRILLIE FRÈRES. Regulating aiming of guns at aerial targets. (127,314.)

5,524. Sir H. FOWLER and P. SALMON. I.C. engines for aircraft, etc. (127,326.)

5,553. H. R. RICARDO. Driving gear for propellers. (127,328.)

5,671. T. ANTOINE. Pedal control for aeroplanes, etc. (127,332.)

5,786. A. H. GLEDHILL. Apparatus for releasing bodies from aircraft. (127,337.)

5,974. J. S. RUSTON and A. E. L. CHORLTON. I.C. engines. (127,346.)

8,698. MAISON BREGUET and J. L. ROUTIN. Chronotelemetrical apparatus for anti-aircraft guns. (127,348.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published June 26, 1919

7,321. DUNLOP RUBBER CO., C. MACBETH and W. H. PAULL. Wheels. (127,373.)

8,888. W. W. CHRISTMAS and CHRISTMAS AEROPLANE CO. Aeroplanes. (127,402.)

9,519. C. H. VAN ASPEREN. Aerial lifting devices. (127,418.)

19,335. A. W. WILLMER. Fire extinguishing apparatus for aircraft (127,500.)

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